

KIC 009405865

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})
009405865-01	OBS	No	2.687938	132.916423	32.9	7.937	11.2	8.9	1.58	7193	1.16	3334.88
009405865-02	OBS	No	2.688062	134.104001	33.6	1.293	11.5	5.6	1.58	7193	1.07	3334.68
009405865-03	OBS	No	2.688136	134.075997	40.7	8.228	12.8	7.5	1.58	7193	1.17	3334.55
009405865-04	OBS	No	2.687889	133.511935	49.4	9.086	12.4	14.2	1.58	7193	1.29	3334.96
009405865-05	OBS	No	61.502893	190.200197	187.7	6.572	8.2	7.1	1.58	7193	2.37	51.34
009405865-06	OBS	No	115.844151	210.325697	347.2	2.542	7.5	8.0	1.58	7193	3.38	22.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009405865-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009405865-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—HALO_GHOST
009405865-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD
009405865-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFFS
009405865-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_MEAS
009405865-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

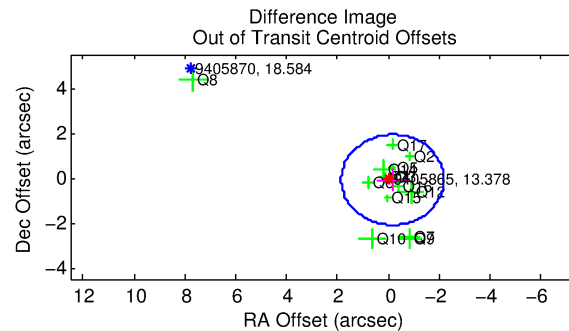
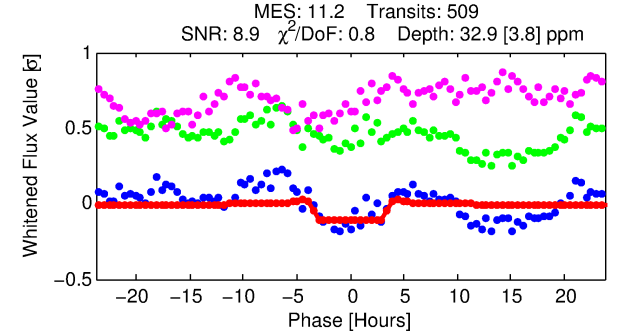
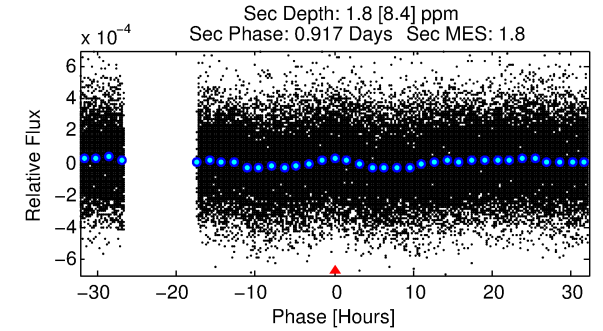
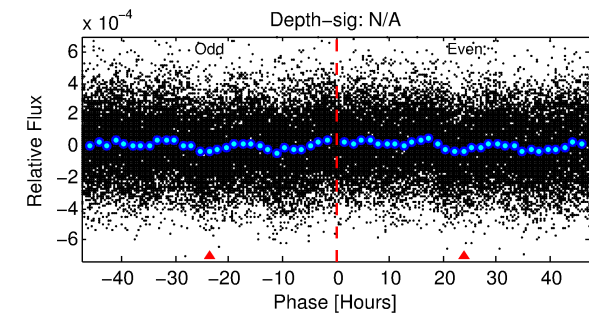
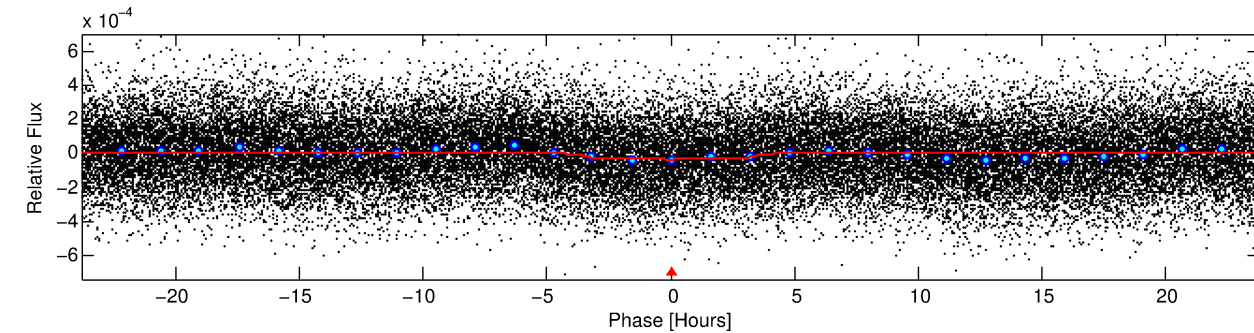
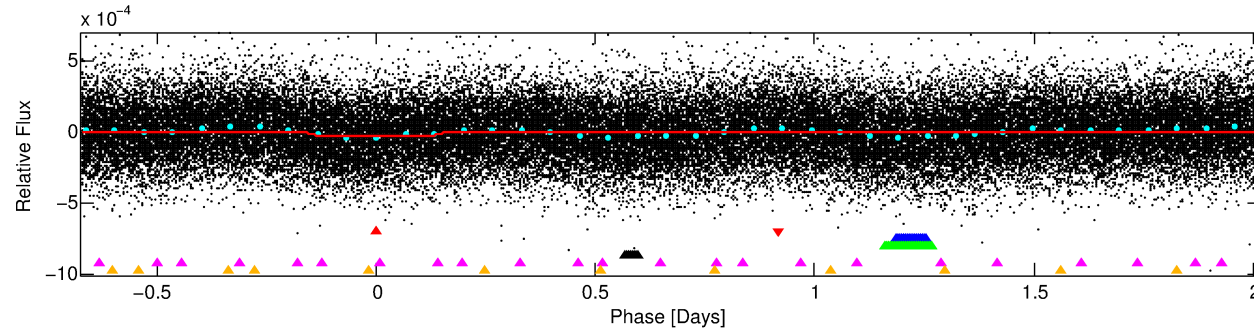
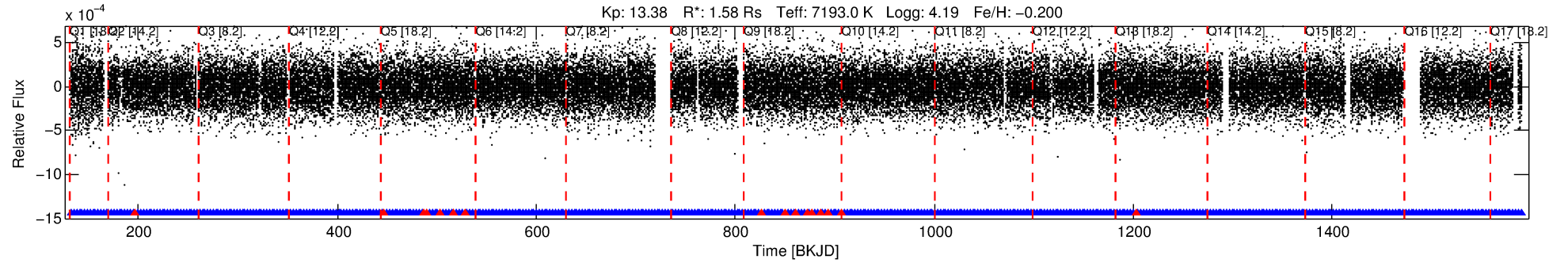
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009405865-01

No Significant Match Found

DV One-Page Summary

KIC: 9405865 Candidate: 1 of 6 Period: 2.688 d



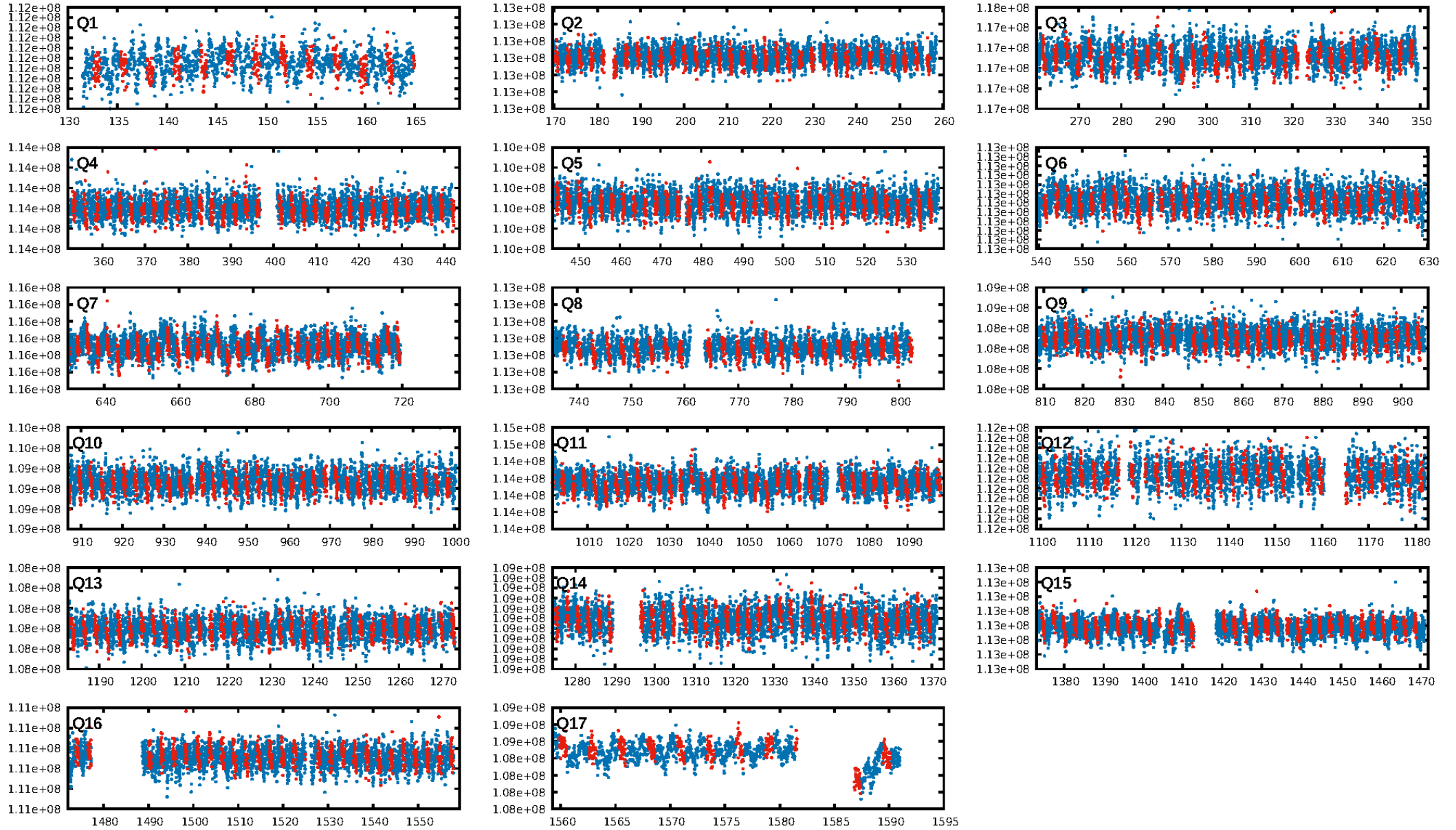
DV Fit Results:

Period = 2.68794 [0.00004] d
Epoch = 132.9164 [0.0087] BKJD
Rp/R* = 0.0067 [0.0005]
a/R* = 1.18 [0.12]
b = 0.98 [0.02]
Seff = 3334.88 [1331.39]
Teq = 1938 [193] K
Rp = 1.16 [0.38] Re
a = 0.0424 [0.0109] AU
Ag = 1.34 [6.14] [0.06σ]
Teffp = 3225 [3676] K [0.35σ]

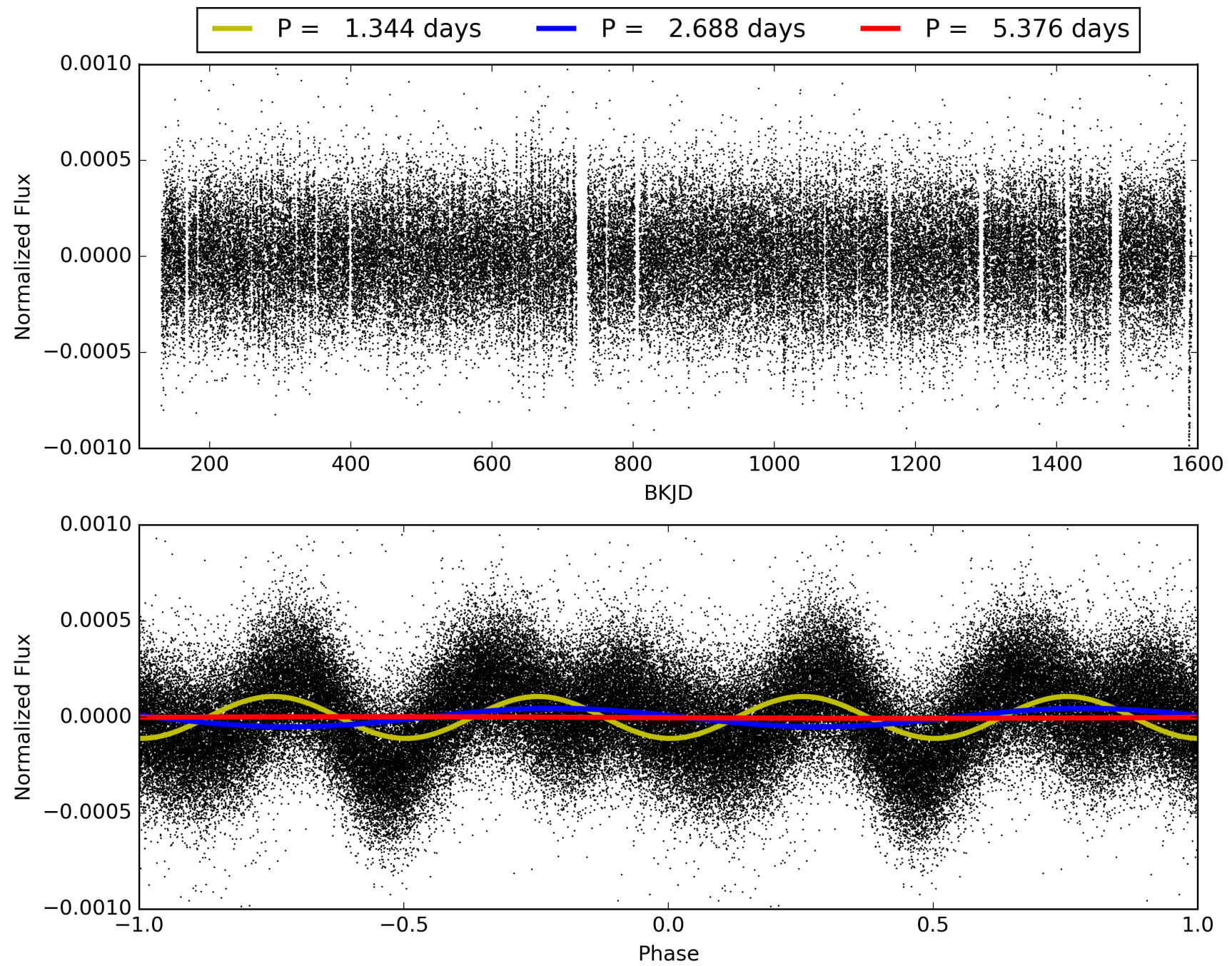
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.81e-36
RollingBand-fgt: 0.97 [470/486]
GhostDiagnostic-chr: 6.634
Centroid-sig: 43.1%
Centroid-so: 0.725 arcsec [0.94σ]
OotOffset-rm: 0.186 arcsec [0.28σ]
KicOffset-rm: 0.245 arcsec [0.34σ]
OotOffset-st: 4/3/4/3 [14]
KicOffset-st: 4/3/4/3 [14]
DiffImageQuality-fgm: 0.43 [6/14]
DiffImageOverlap-fno: 0.00 [0/17]

TCE 009405865-01, PDC Light Curves

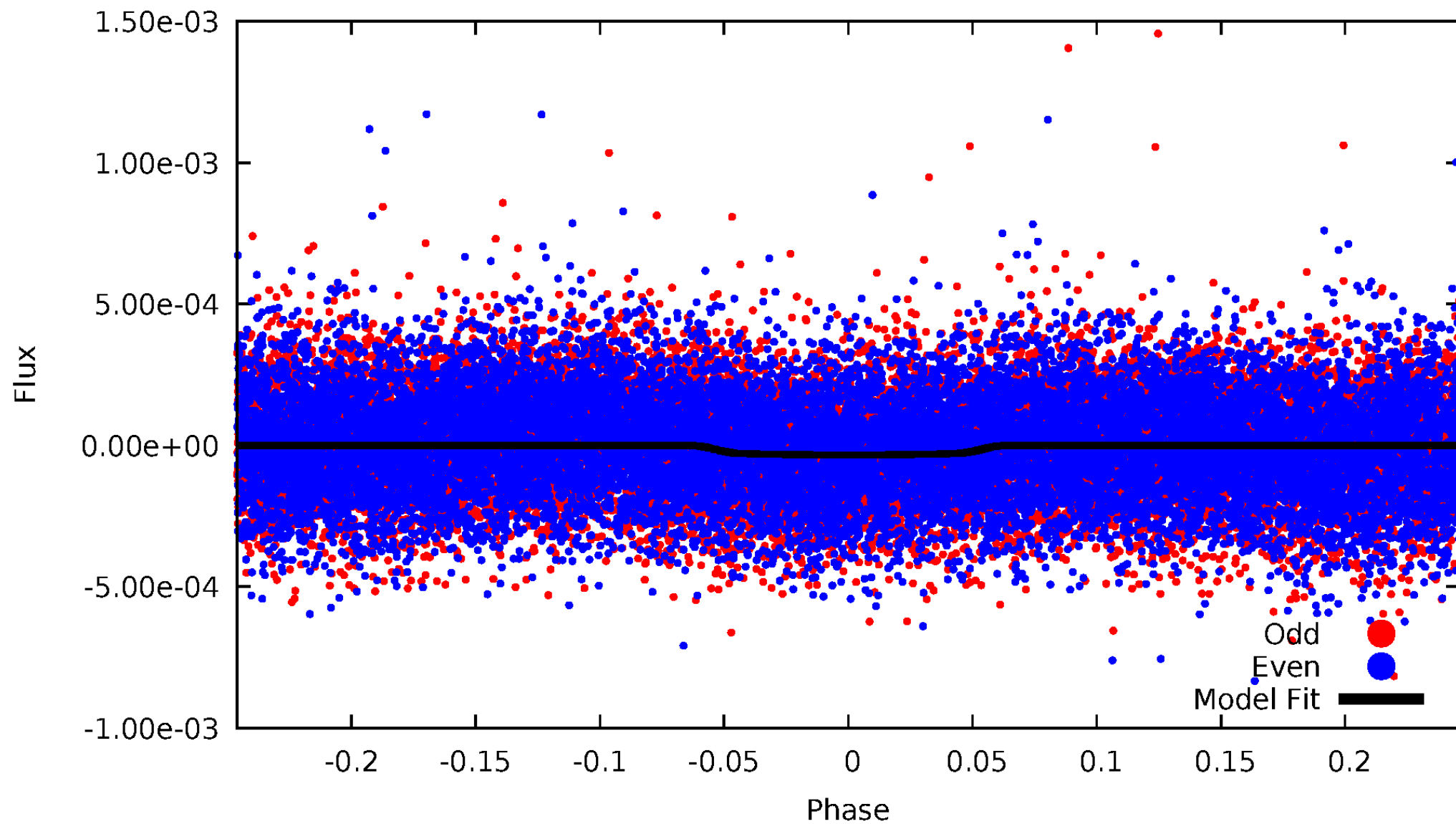


TCE 009405865-01



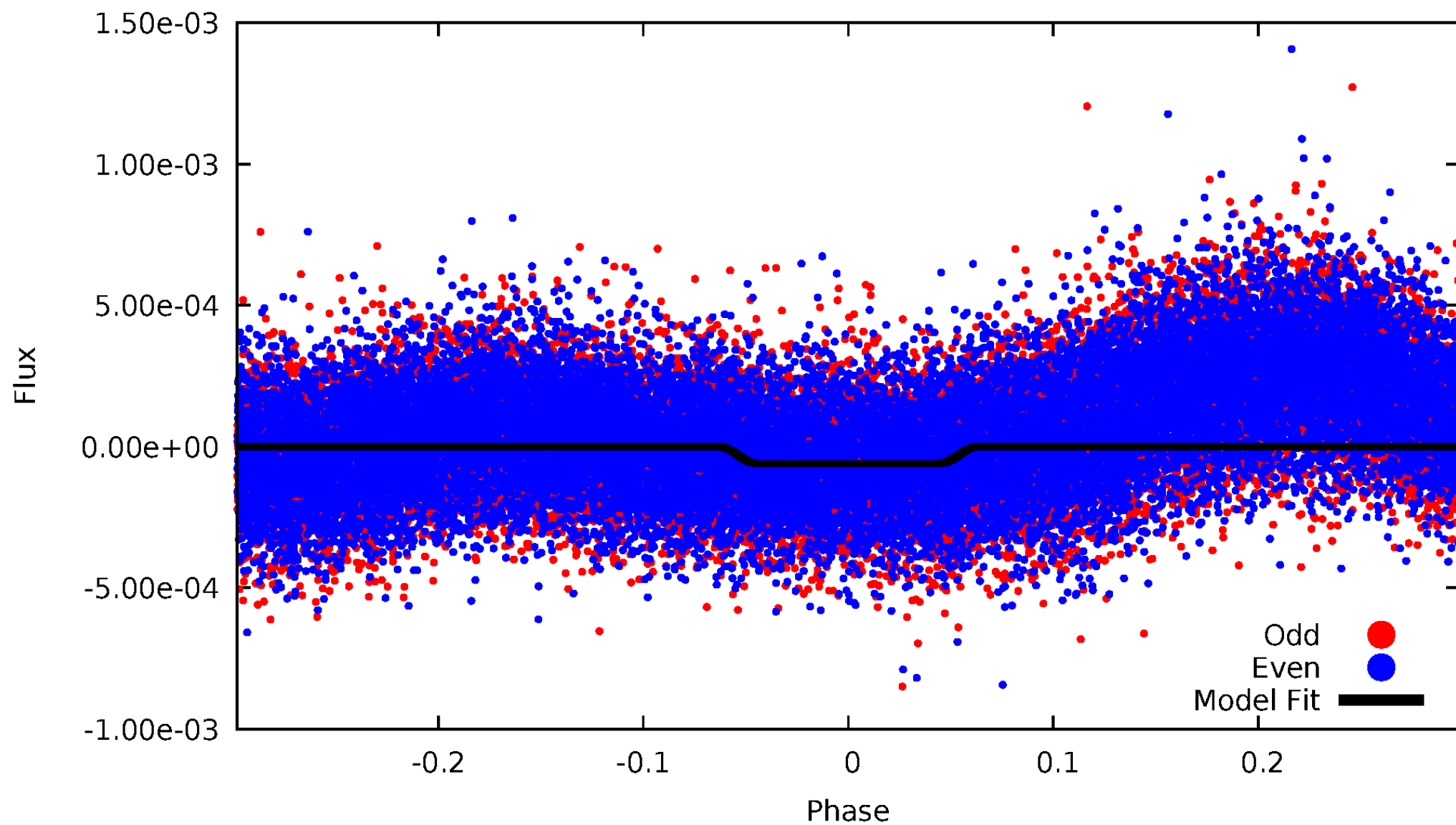
DV Odd/Even

TCE 009405865-01

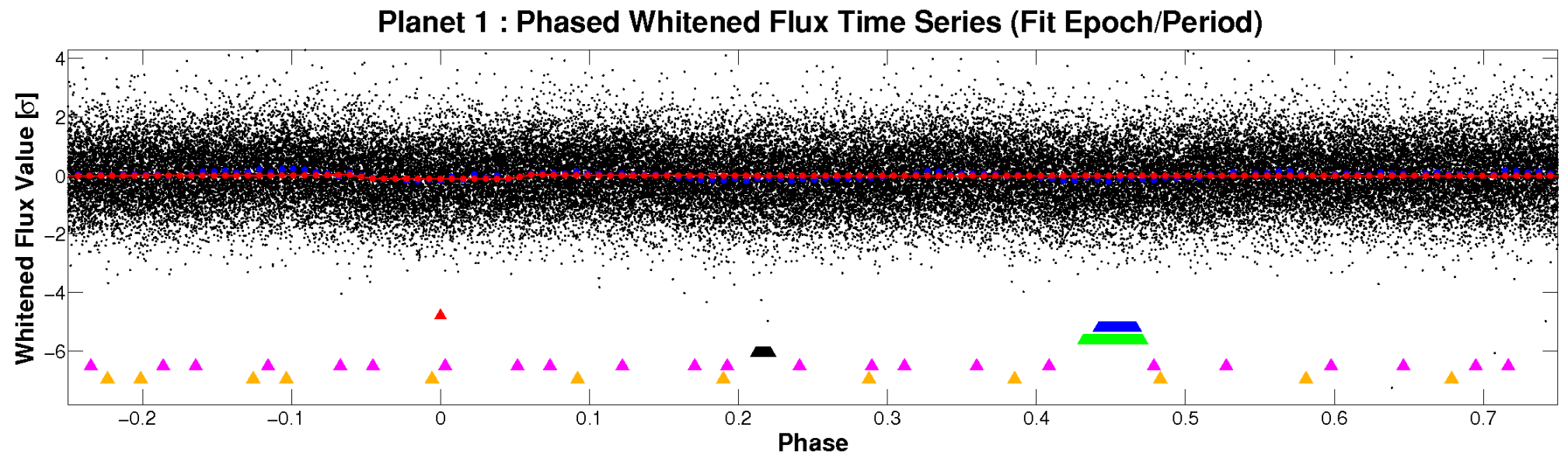
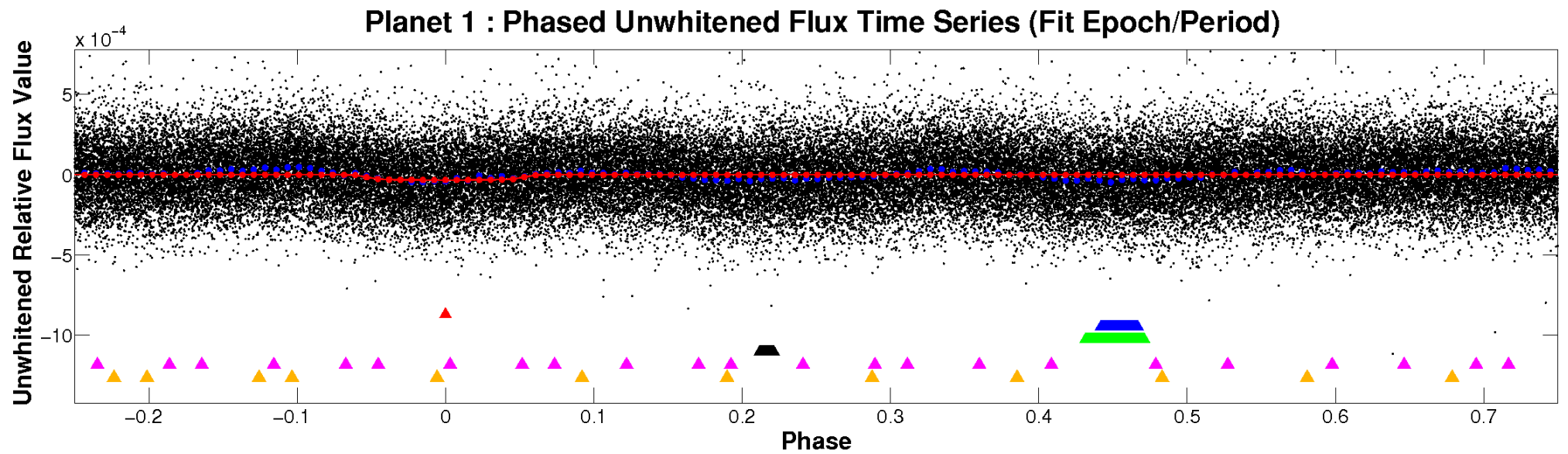


ALT Odd/Even

TCE 009405865-01

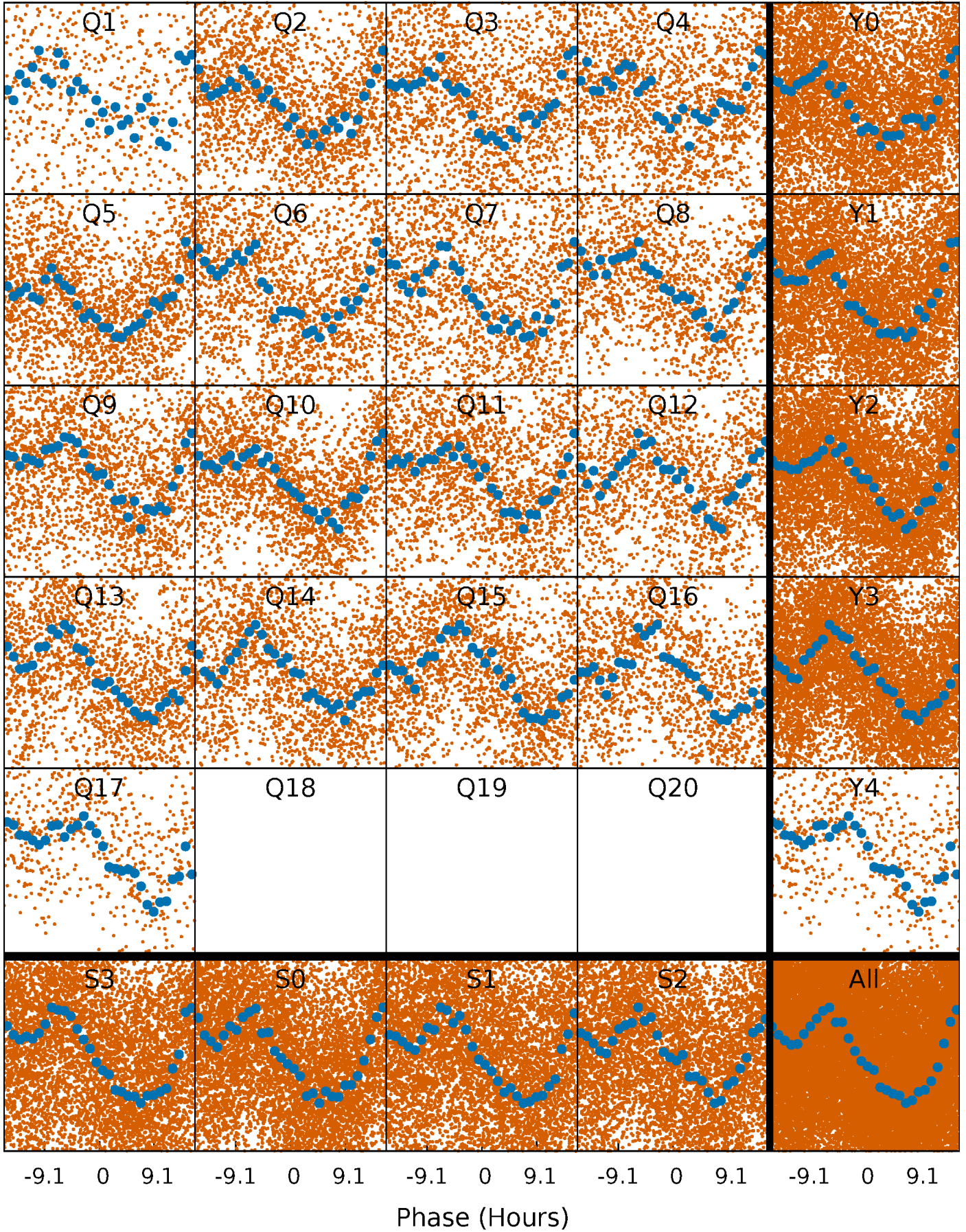


Non-Whitened Vs. Whitened Light Curve



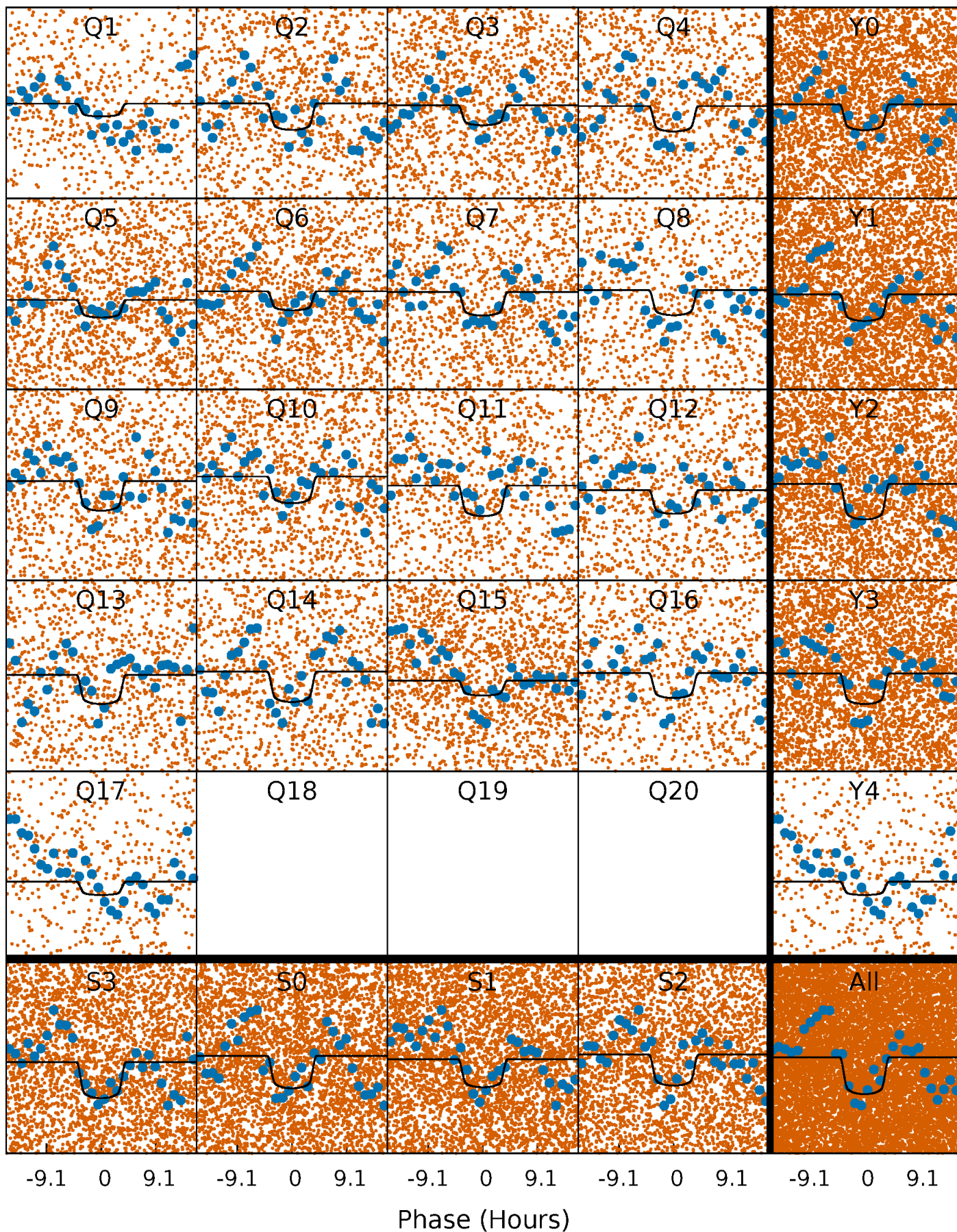
PDC Quarter-Phased Transit Curves

TCE 009405865-01 P= 2.687938 Days $T_0=132.916424$ (BKJD)



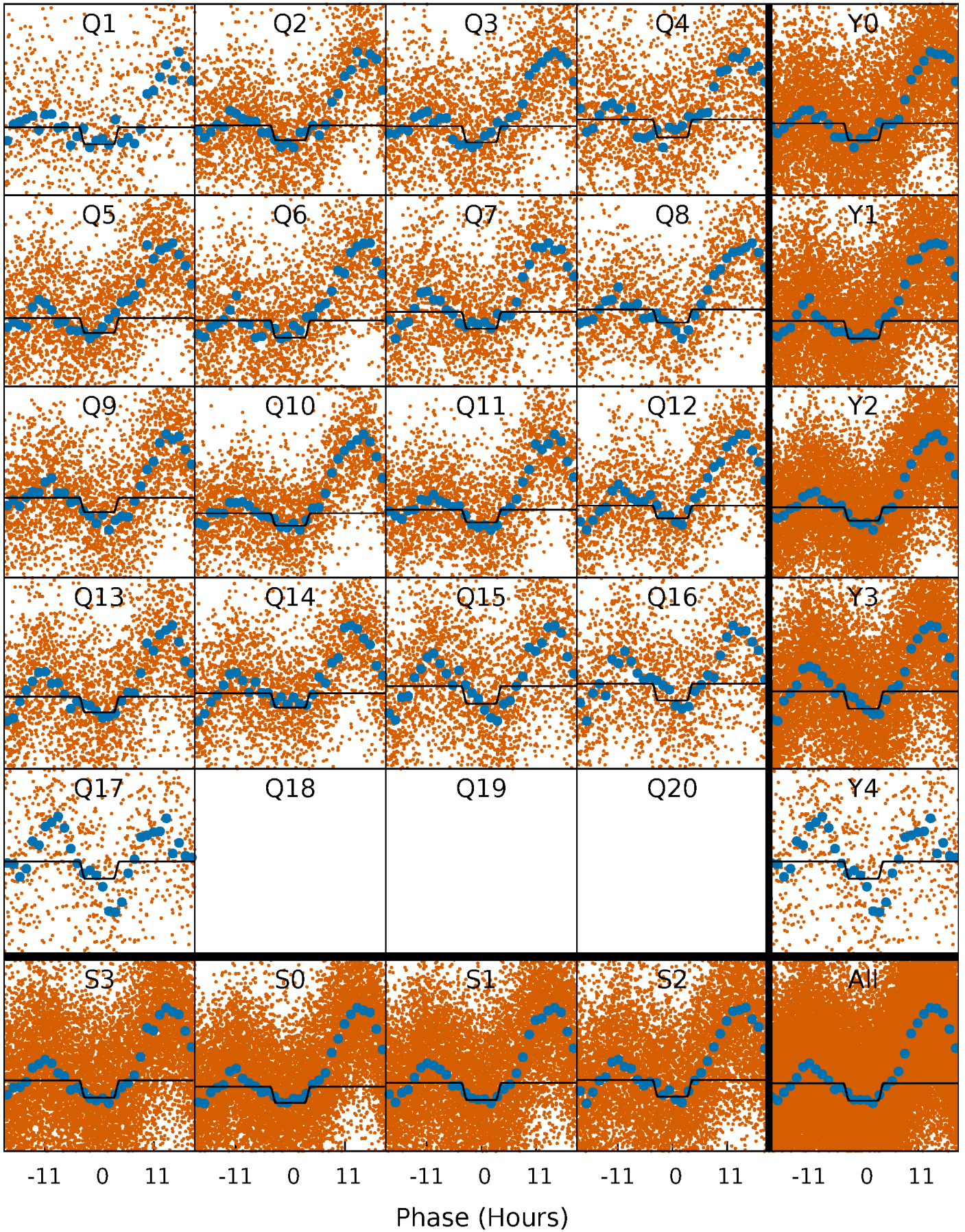
DV Quarter-Phased Transit Curves

TCE 009405865-01 P= 2.687938 Days $T_0=132.916424$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

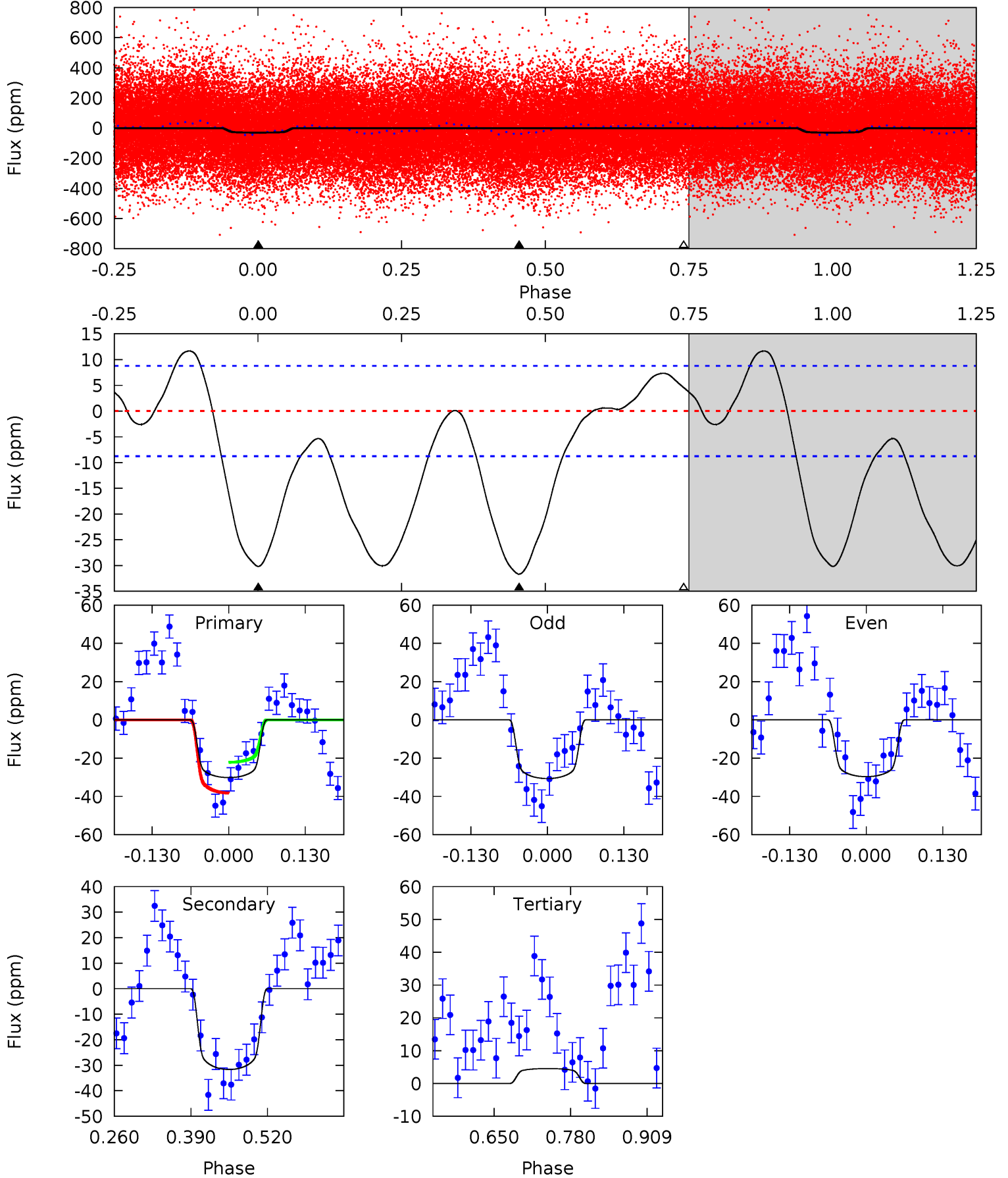
TCE 009405865-01 P= 2.688099 Days $T_0=133.090741$ (BKJD)



DV Model-Shift Uniqueness Test

009405865-01, P = 2.687938 Days, E = 130.228486 Days

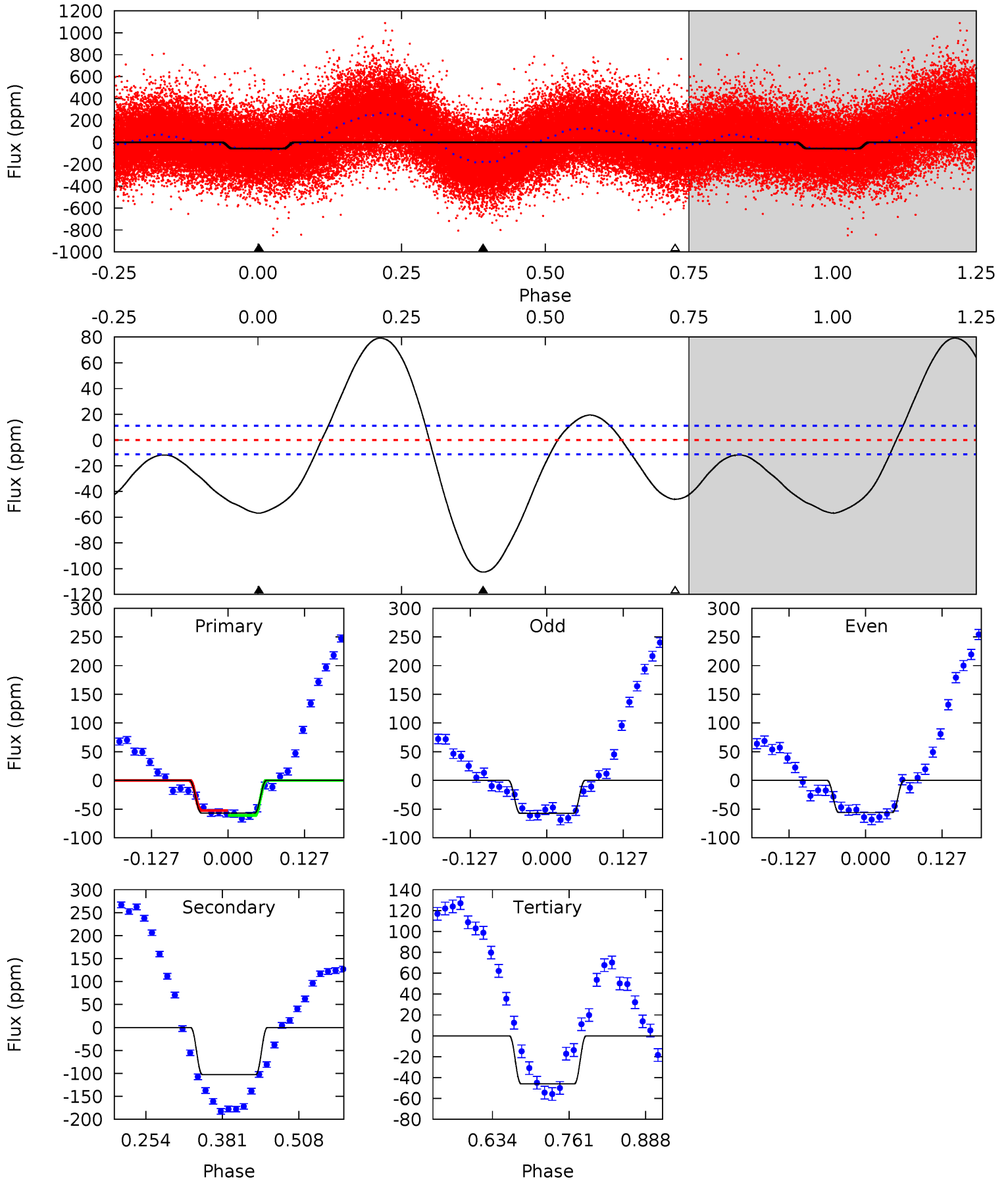
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.5	16.3	-2.34	0	4.51	1.51	6.49	17.8	15.5	18.6	16.3	0.25	0.92	0.27	4.18



Alt Model-Shift Uniqueness Test

009405865-01, P = 2.688099 Days, E = 130.402642 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.2	41.9	18.8	0	4.51	1.53	15.9	4.40	23.2	23.1	41.9	0.29	1.02	0.44	1.62



Stellar Parameters For KIC 009405865

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7193^{+200}_{-300}	$4.188^{+0.128}_{-0.192}$	$-0.200^{+0.250}_{-0.350}$	$1.580^{+0.501}_{-0.308}$	$1.409^{+0.218}_{-0.218}$	$0.503^{+0.323}_{-0.267}$
	+3%/-4%	+3%/-5%	+125%/-175%	+32%/-19%	+15%/-15%	+64%/-53%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009405865-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-32 ± 2	$1.18^{+0.21}_{-0.16}$	2719^{+189}_{-170}	6466^{+376}_{-356}	23^{+7}_{-7}
Alt.	-103 ± 2	$1.34^{+0.25}_{-0.16}$	2708^{+233}_{-162}	8399^{+528}_{-475}	56^{+16}_{-16}

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

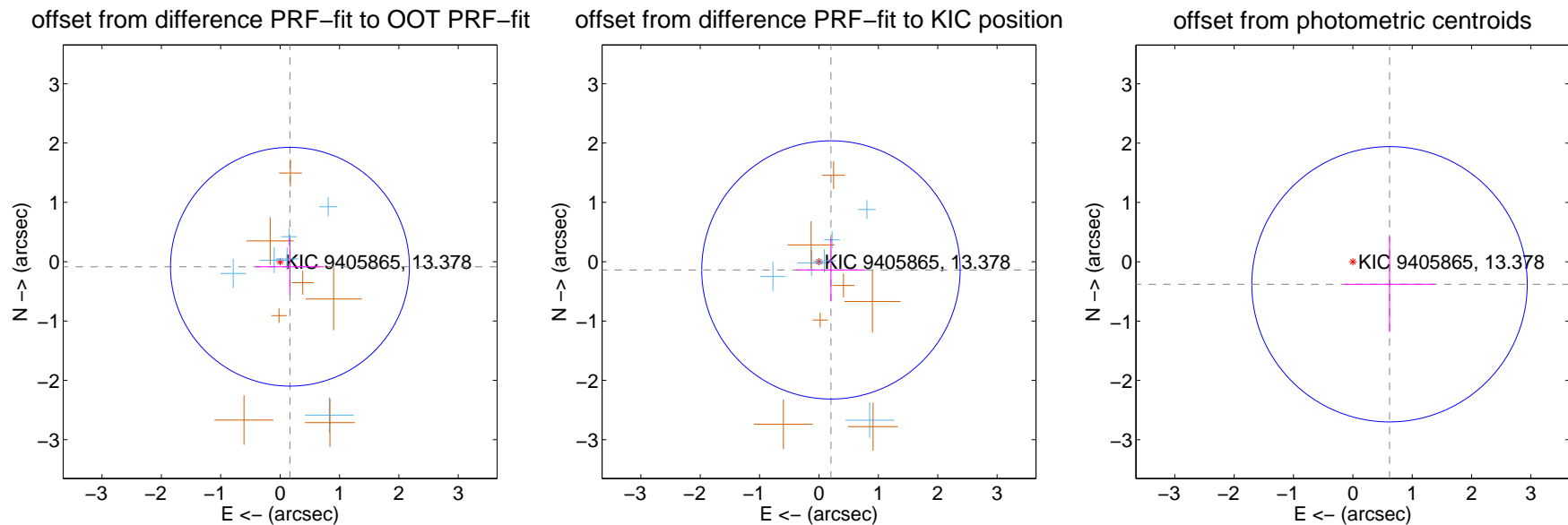
DV Centroid Data

Supplemental centroid analysis for 009405865-01. Kepler magnitude: 13.38. Transit SNR 8.94

There are 6 quarters with good PRF difference image offsets

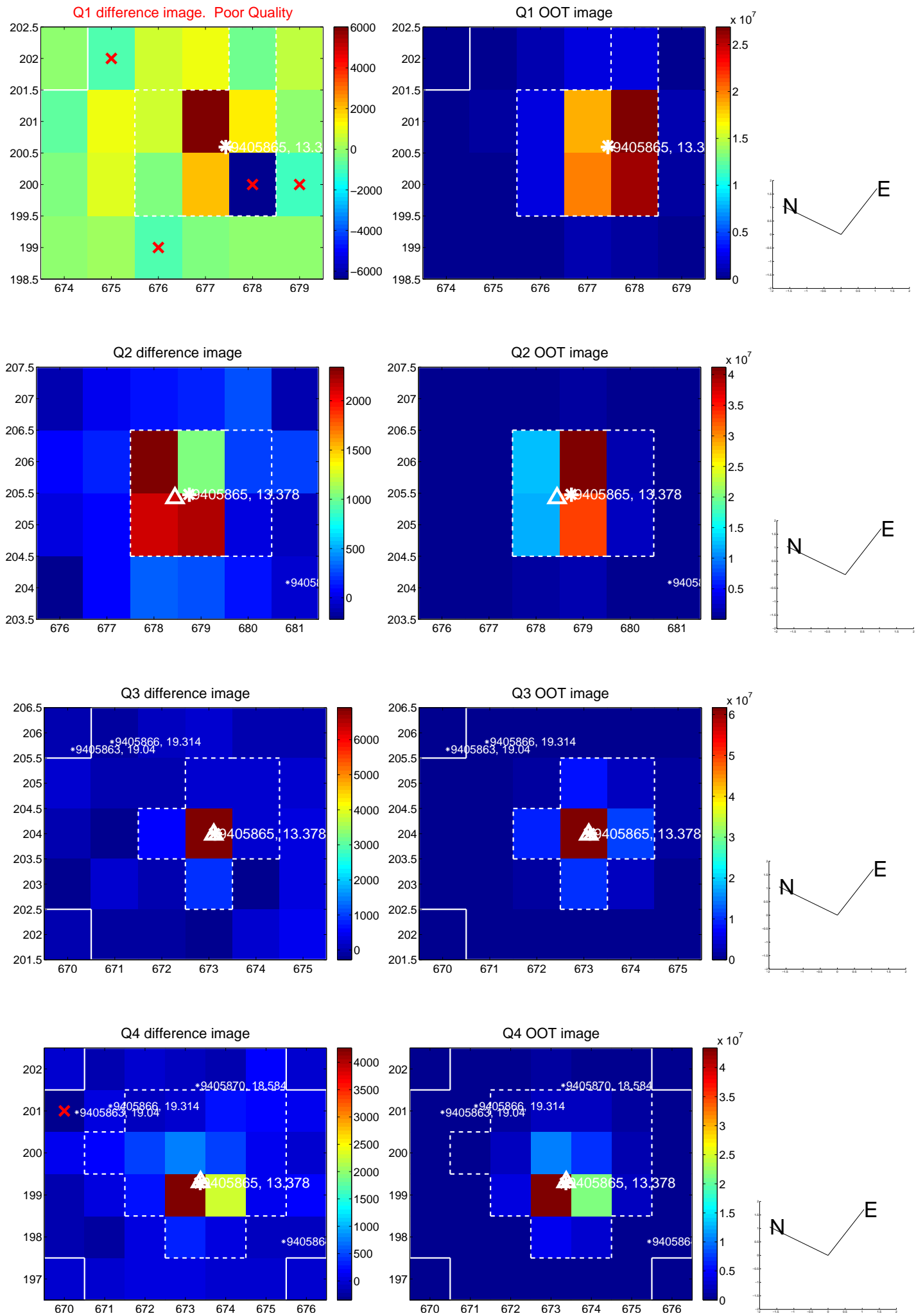
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.186 ± 0.671	0.28	-0.166 ± 0.573	-0.085 ± 0.476
PRF-fit source offset from KIC position	0.245 ± 0.726	0.34	-0.201 ± 0.584	-0.139 ± 0.529
photometric centroid source offset	0.72 ± 0.77	0.94	-0.62 ± 0.76	-0.38 ± 0.80

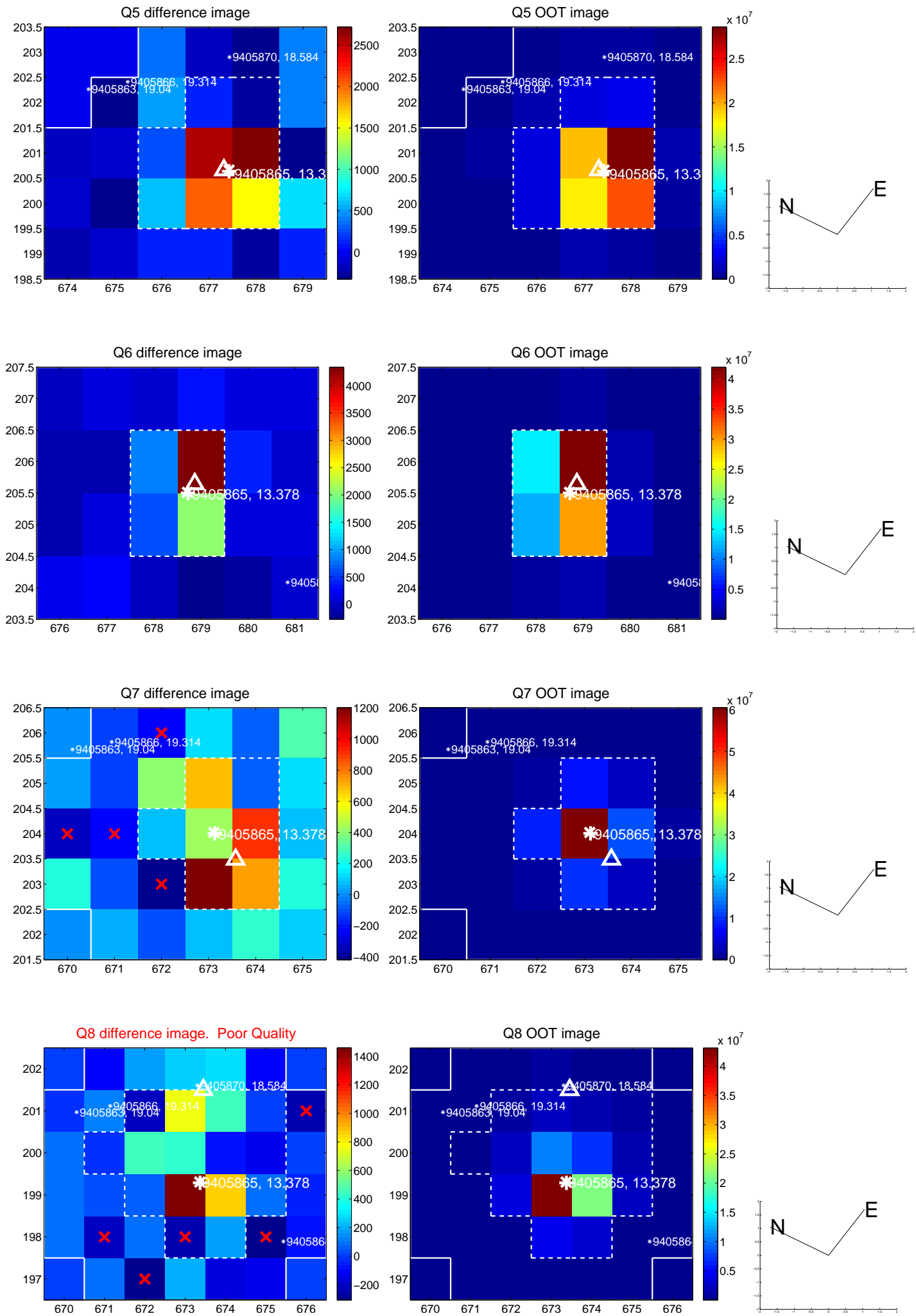


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

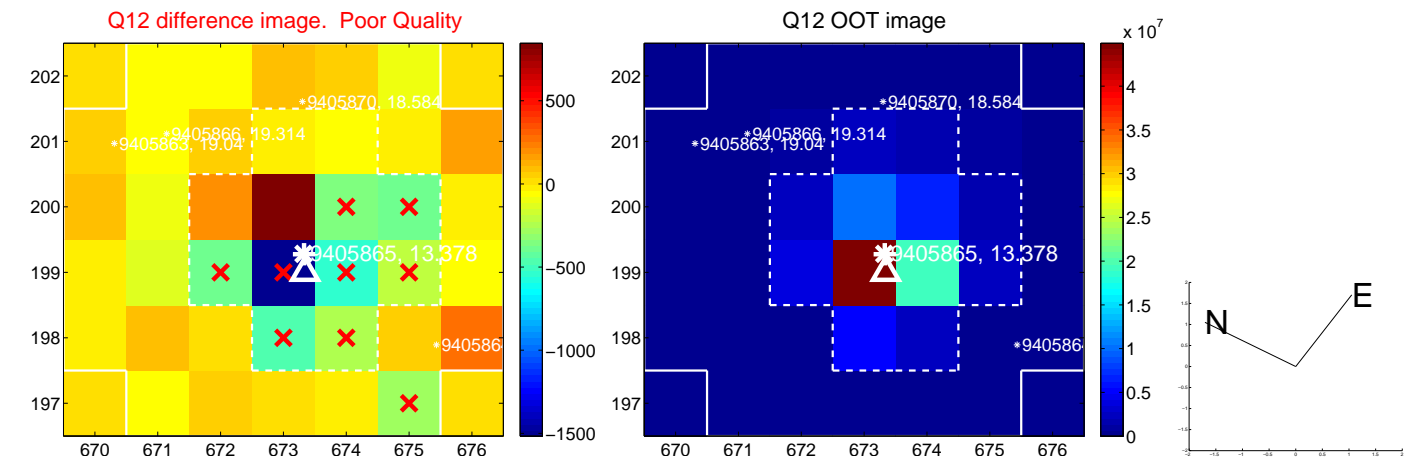
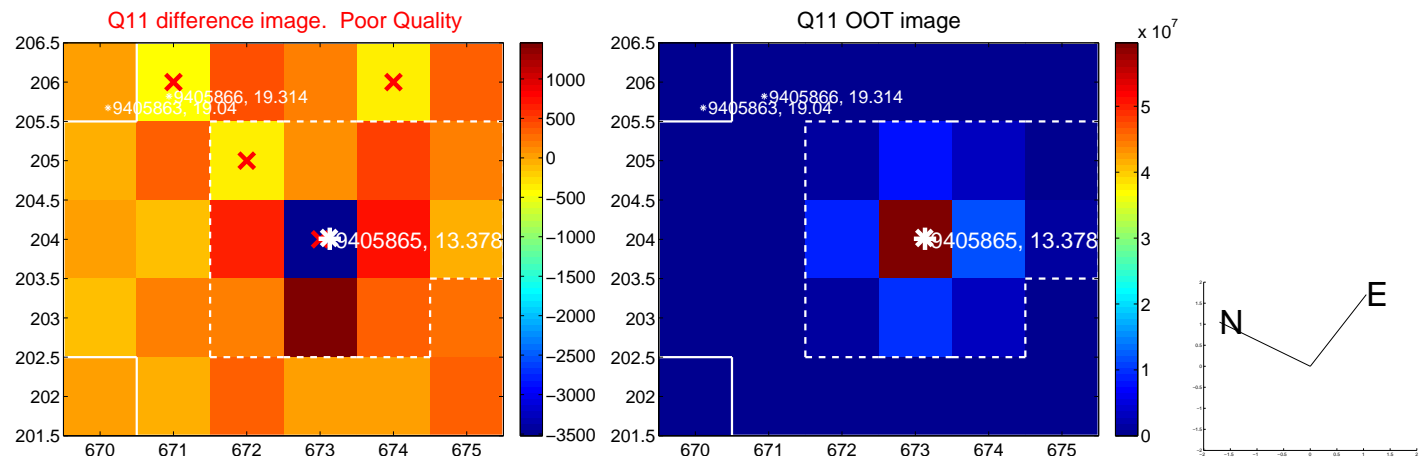
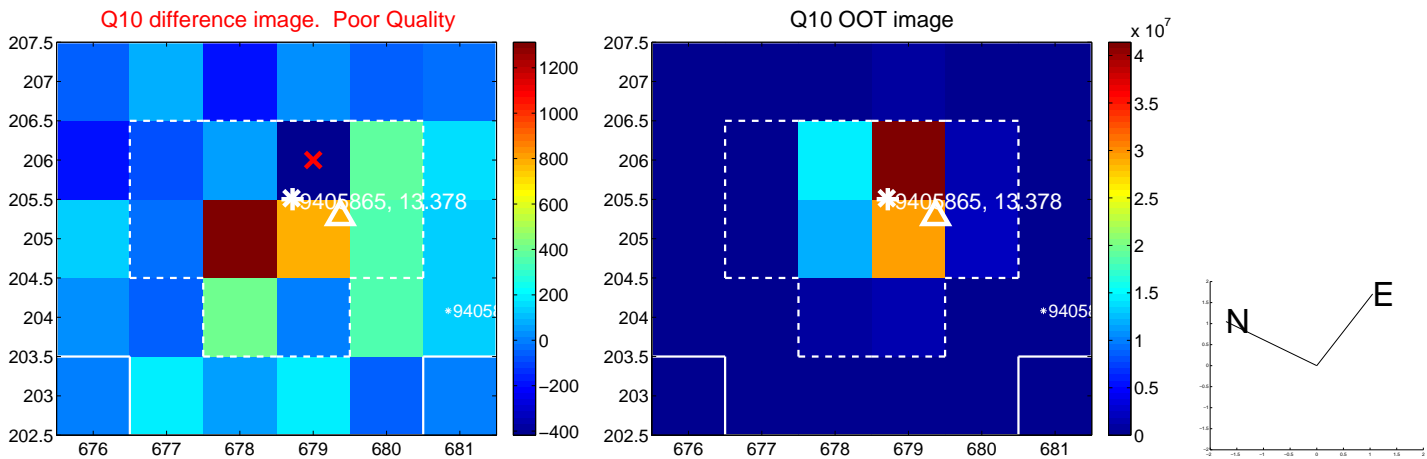
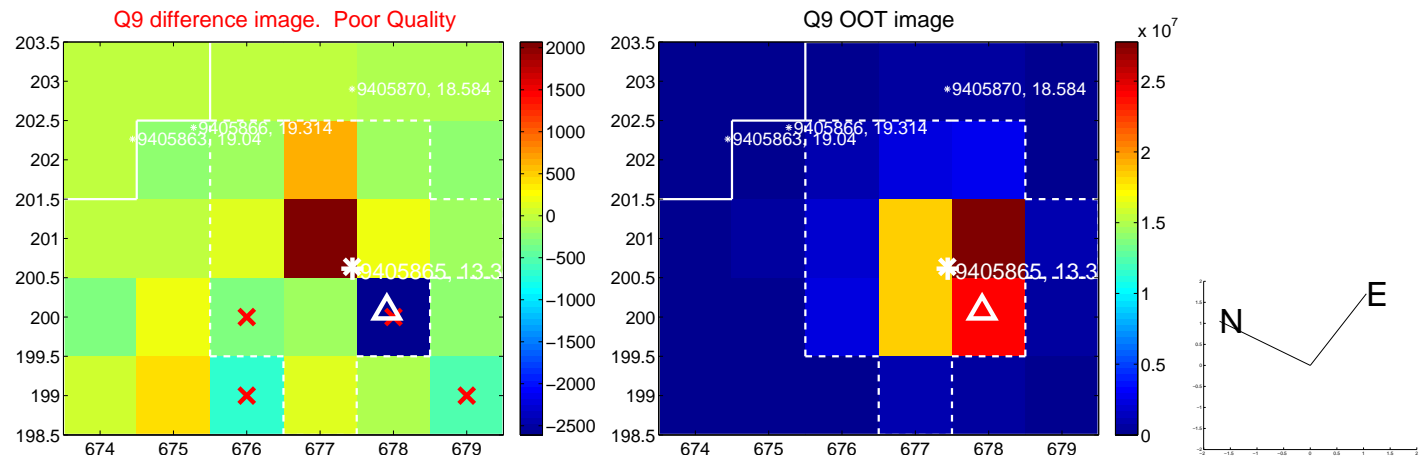
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



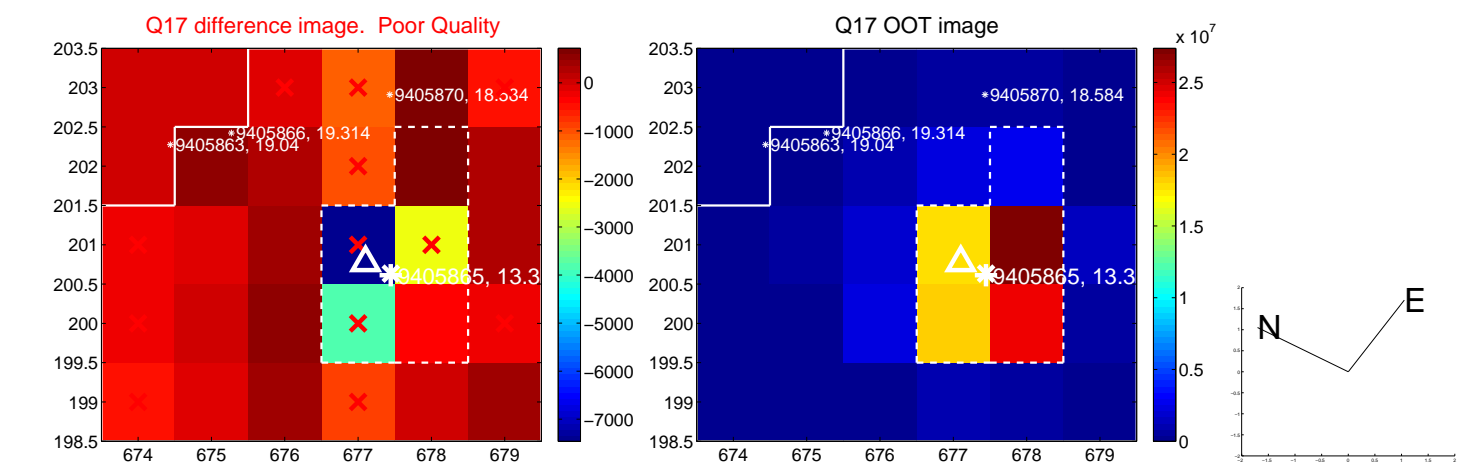
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



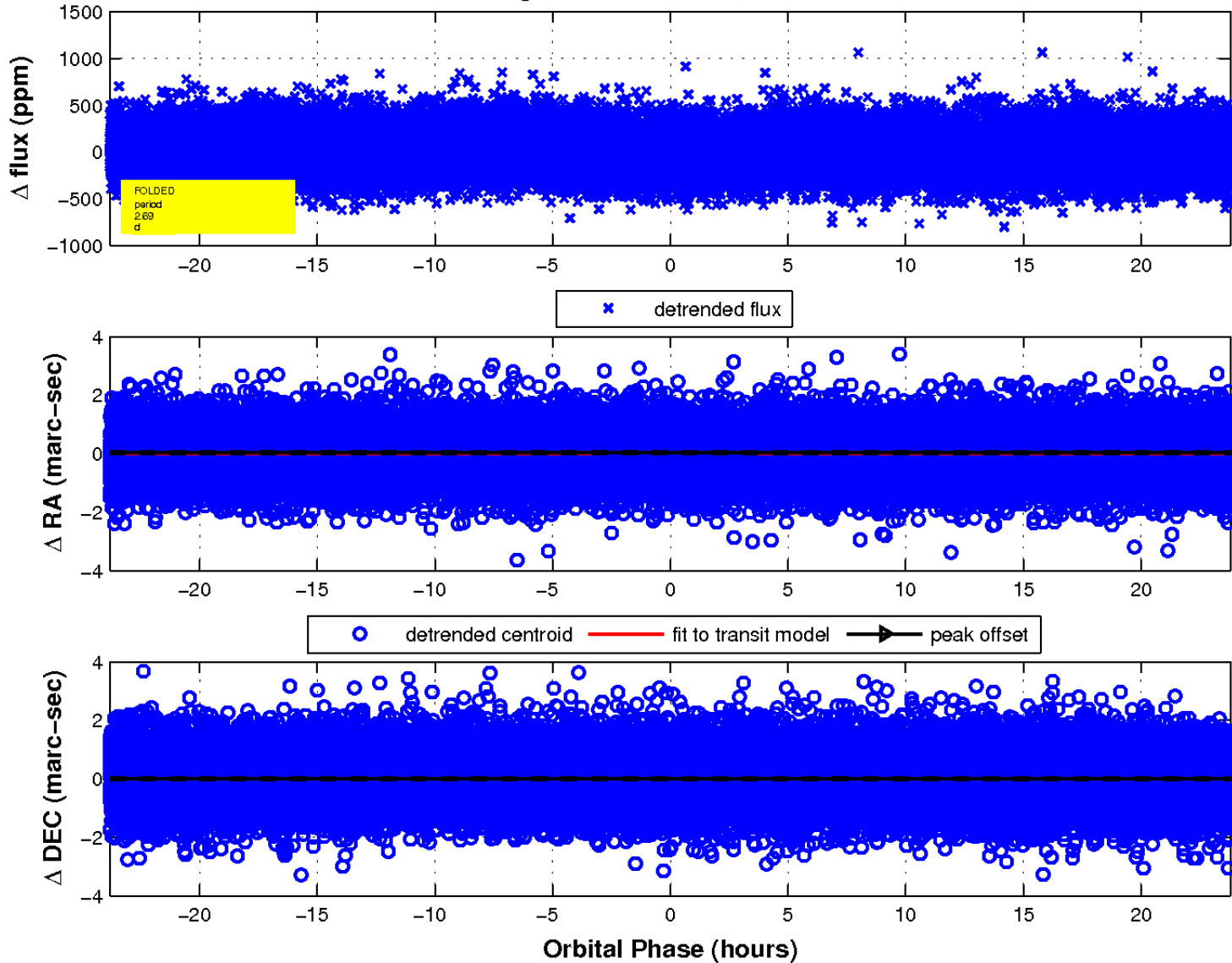
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

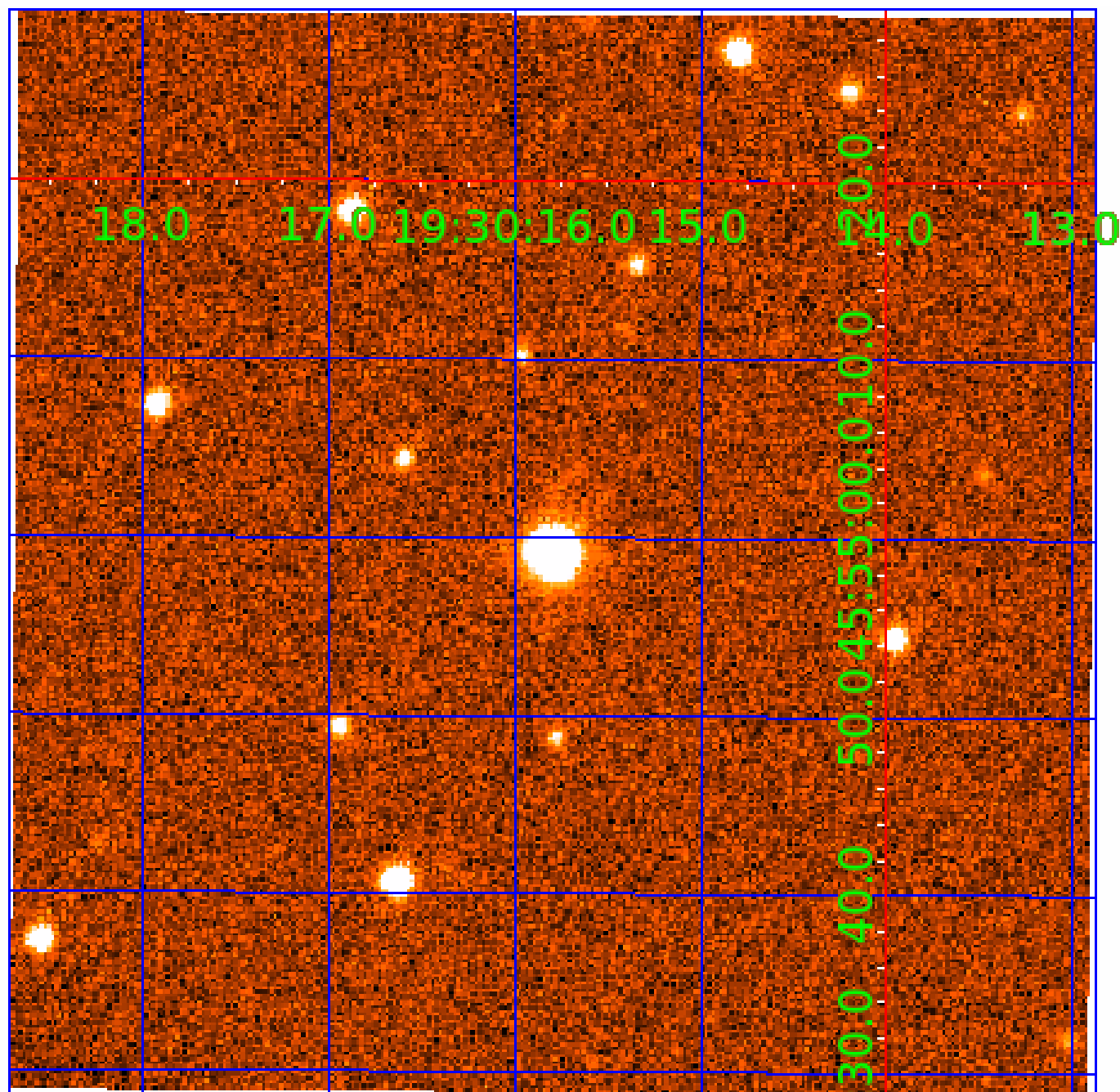


fluxWeightedCentroids, Planet 1 of 6



UKIRT Image

Declination



KIC 009405865

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})
009405865-01	OBS	No	2.687938	132.916423	32.9	7.937	11.2	8.9	1.58	7193	1.16	3334.88
009405865-02	OBS	No	2.688062	134.104001	33.6	1.293	11.5	5.6	1.58	7193	1.07	3334.68
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Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009405865-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009405865-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—HALO_GHOST
009405865-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD
009405865-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFFS
009405865-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_MEAS
009405865-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

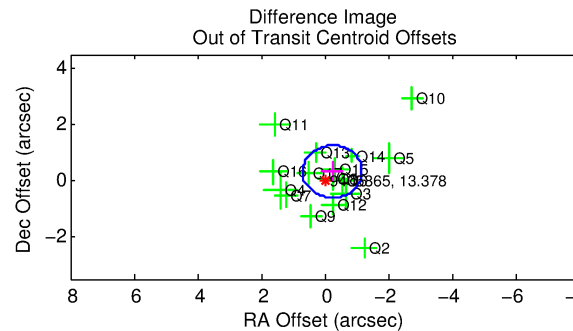
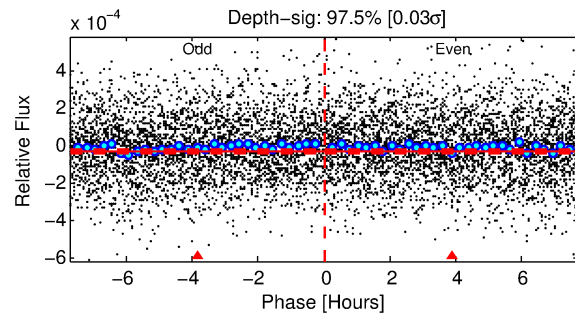
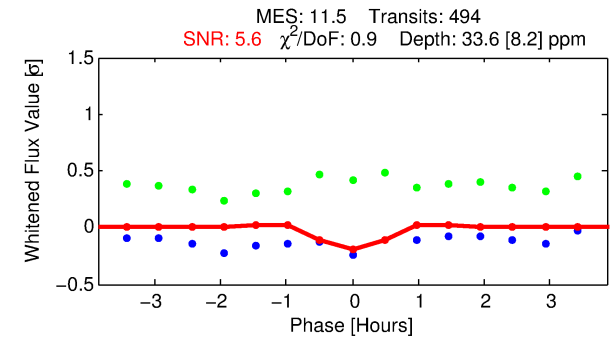
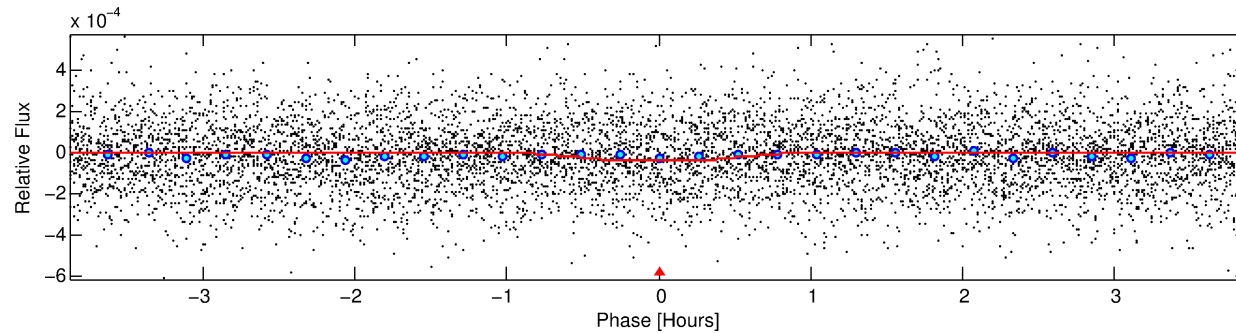
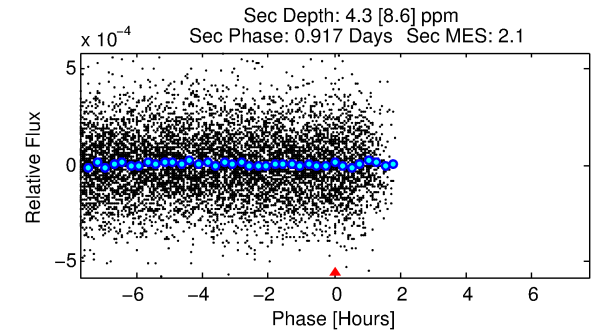
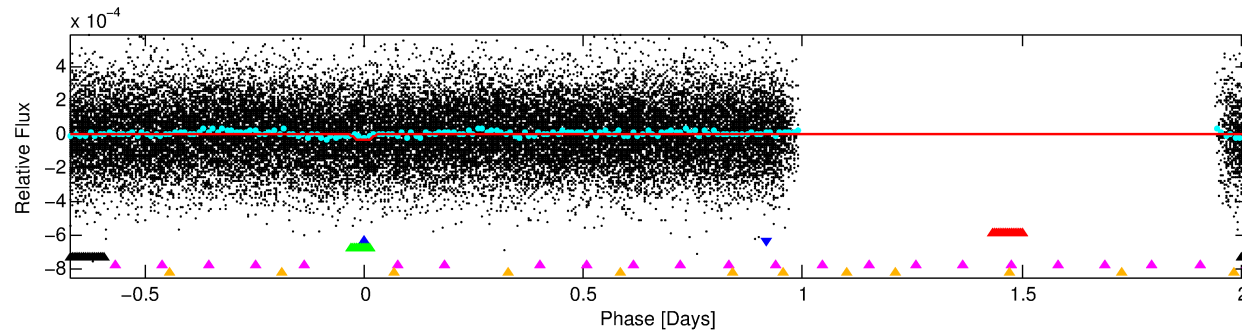
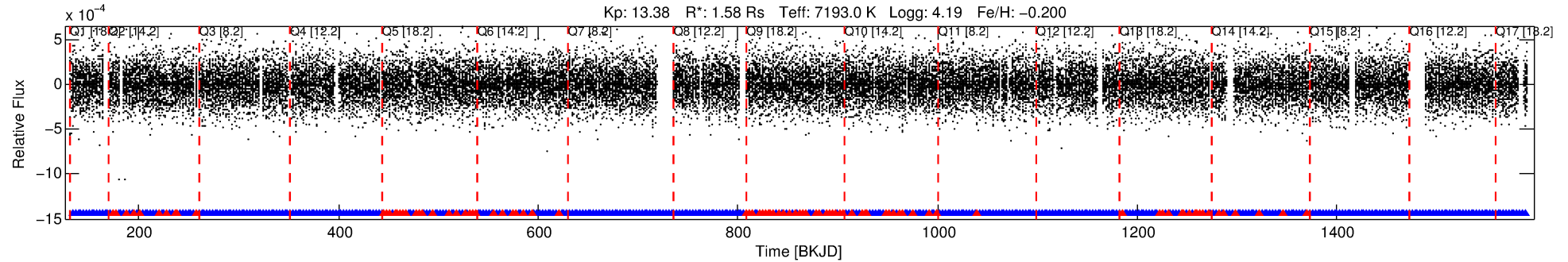
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009405865-02

No Significant Match Found

DV One-Page Summary

KIC: 9405865 Candidate: 2 of 6 Period: 2.688 d



DV Fit Results:

Period = 2.68806 [0.00002] d
Epoch = 134.1040 [0.0042] BKJD
Rp/R* = 0.0062 [0.0024]
a/R* = 7.21 [16.74]
b = 0.90 [0.51]
Seff = 3334.68 [1331.30]
Teff = 1938 [193] K
Rp = 1.07 [0.54] Re
a = 0.0424 [0.0109] AU
Ag = 3.73 [8.16] [0.33σ]
Teffp = 4163 [2255] K [0.98σ]

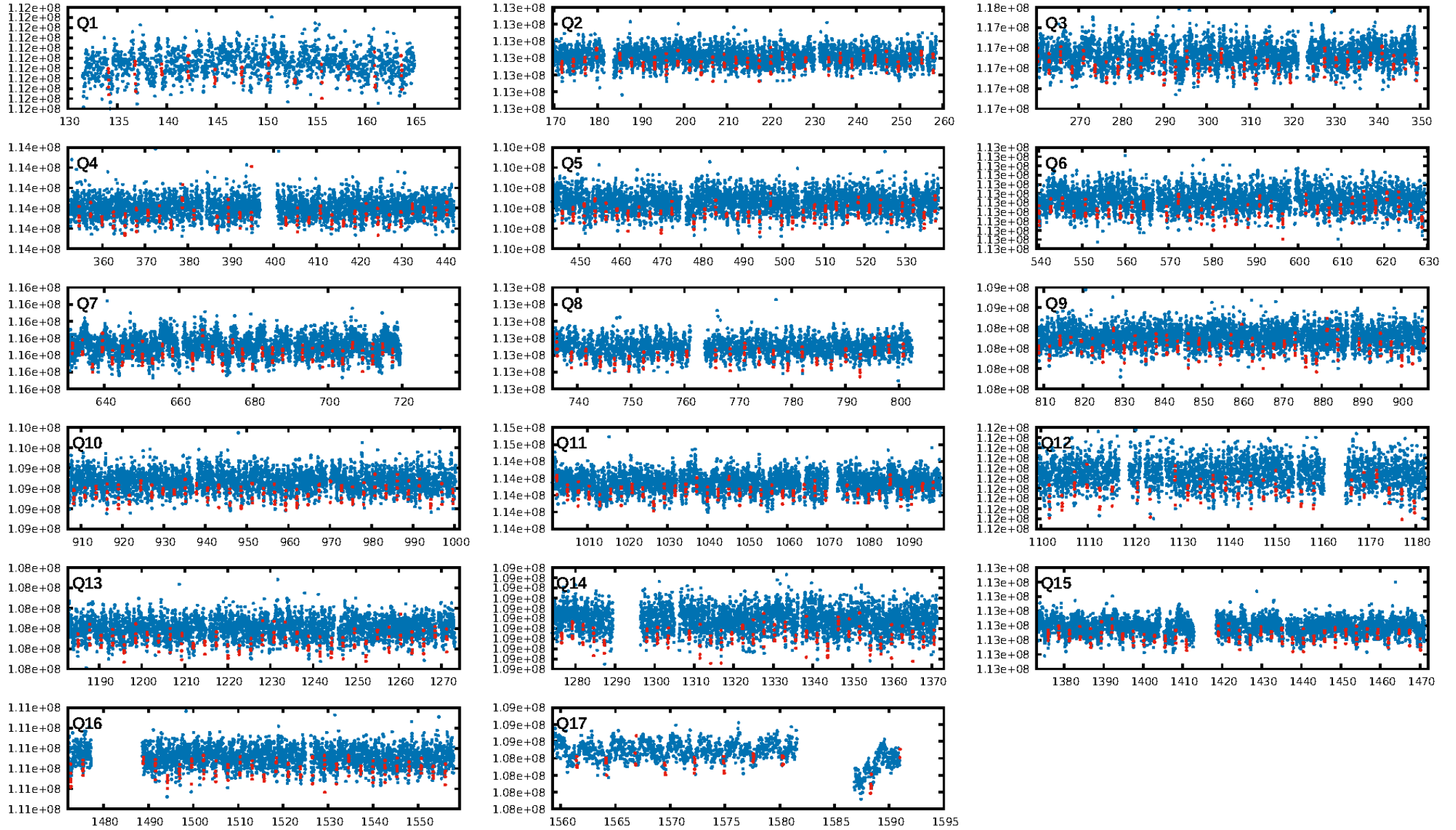
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.75e-37
RollingBand-fgt: 0.81 [382/472]
GhostDiagnostic-chr: 0.1067
Centroid-sig: 23.8%
Centroid-so: 1.628 arcsec [0.87σ]
OotOffset-rm: 0.402 arcsec [1.29σ]
KicOffset-rm: 0.376 arcsec [1.09σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
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DiffImageOverlap-fno: 0.00 [0/17]

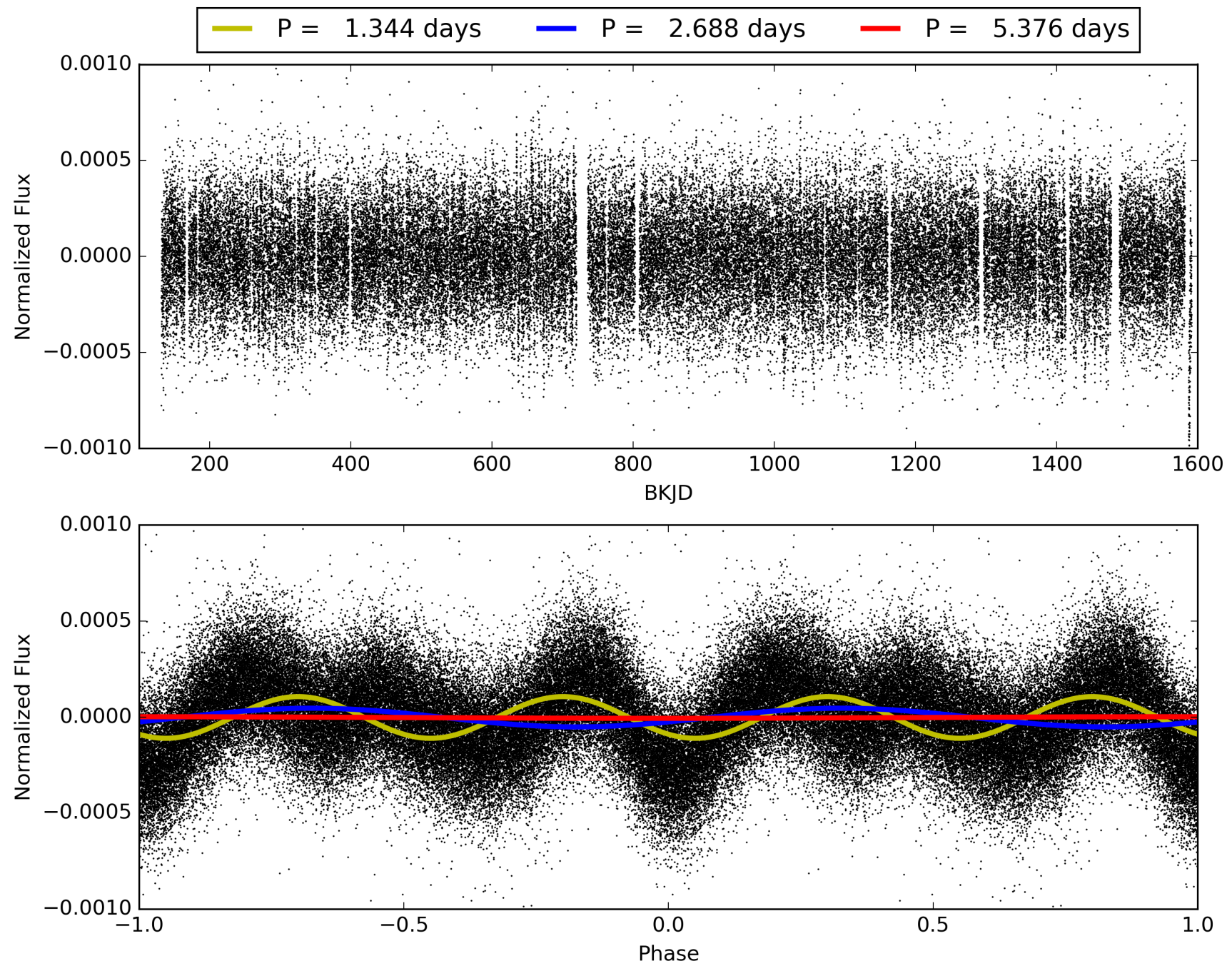
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 009405865-02, PDC Light Curves

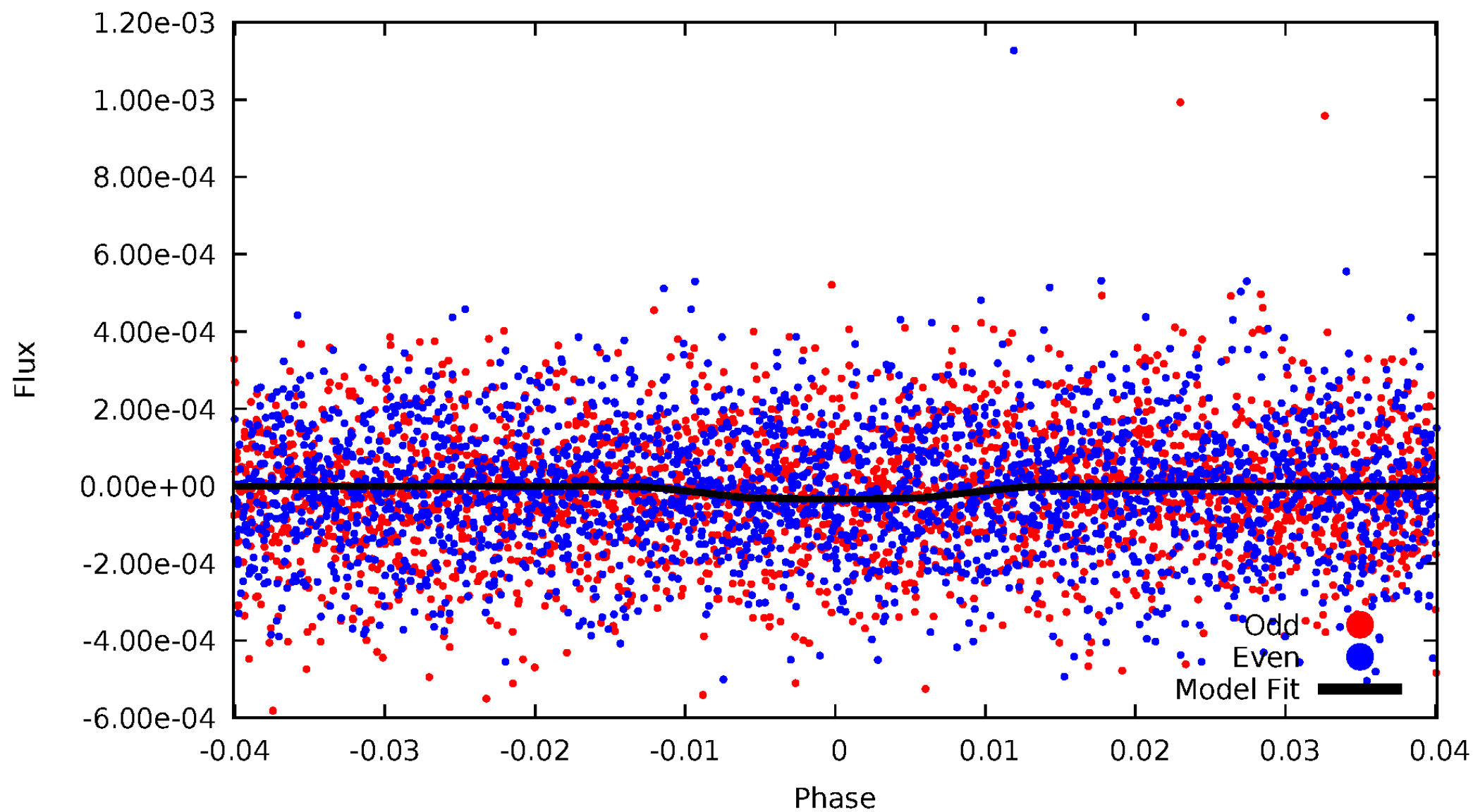


TCE 009405865-02



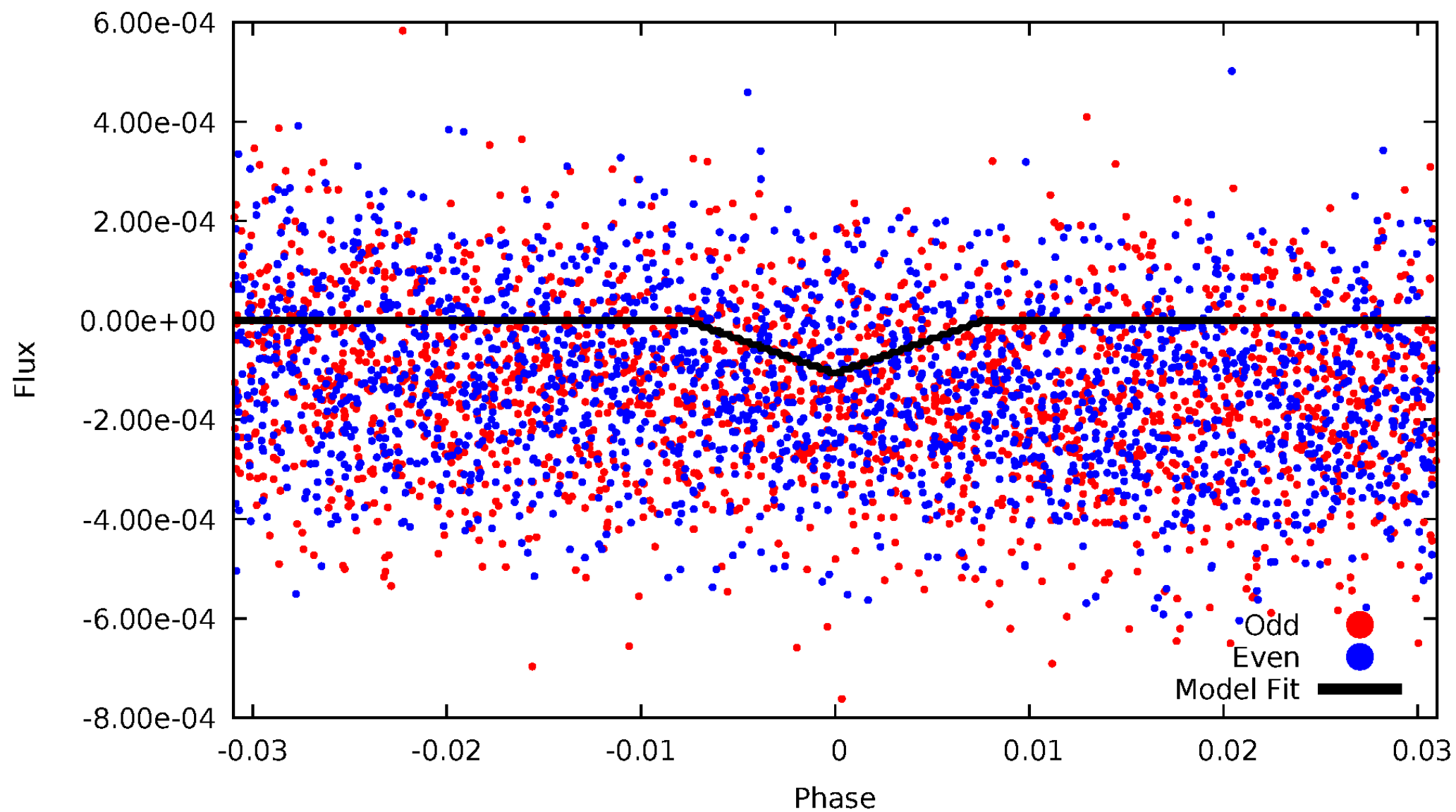
DV Odd/Even

TCE 009405865-02



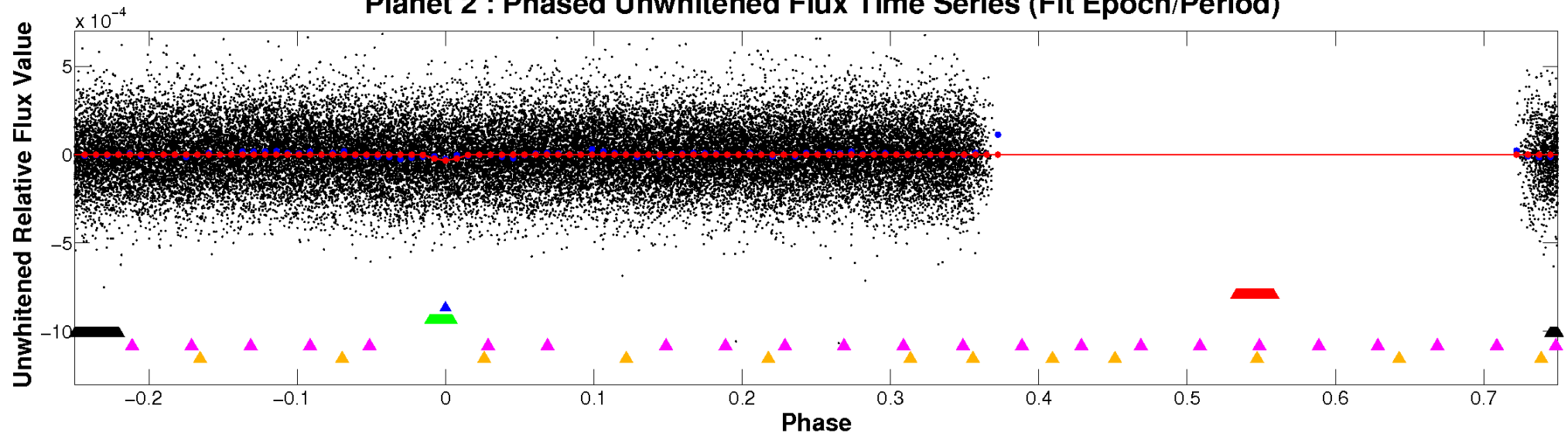
ALT Odd/Even

TCE 009405865-02

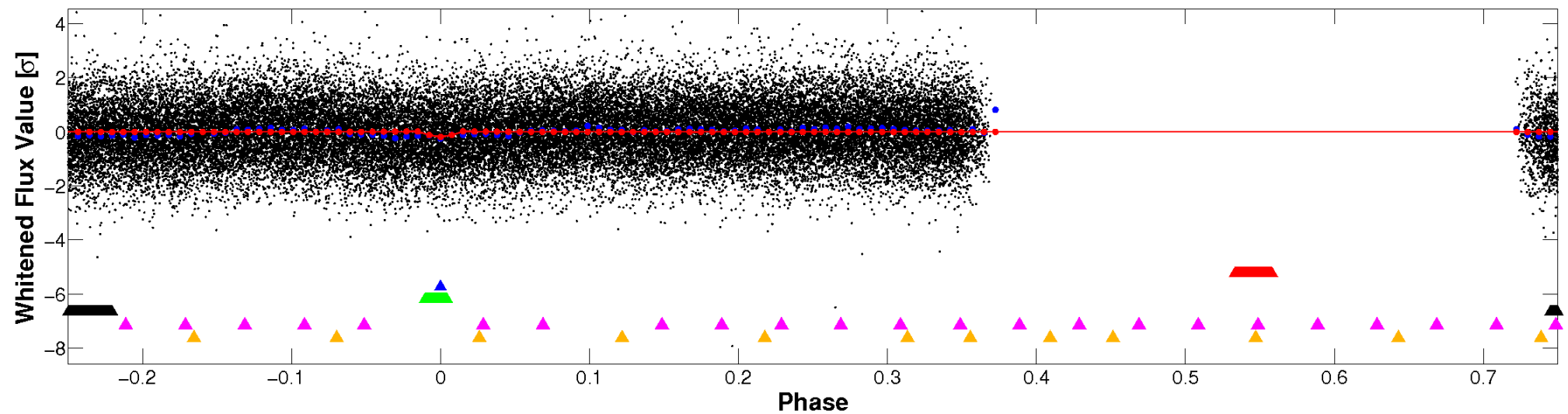


Non-Whitened Vs. Whitened Light Curve

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

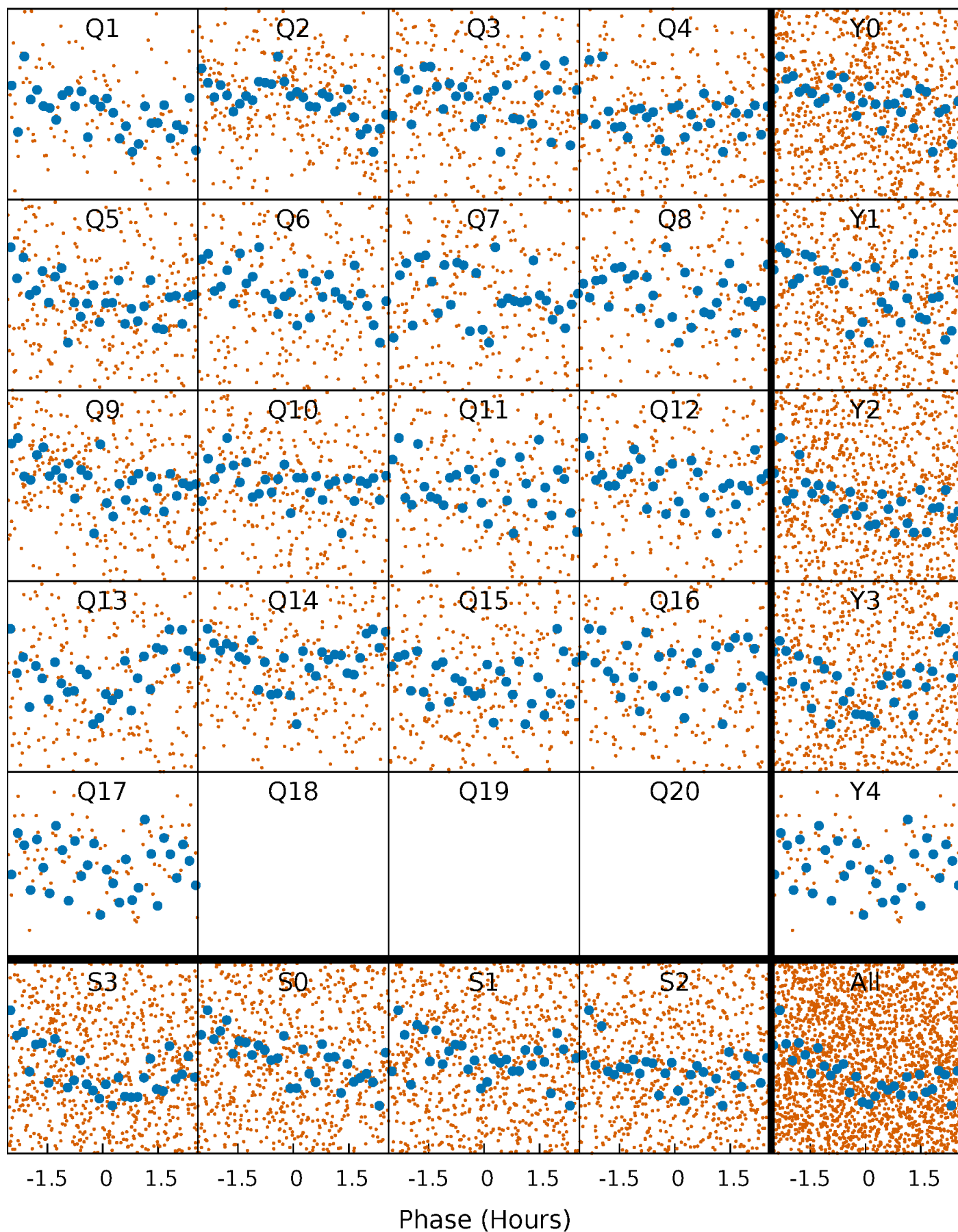


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



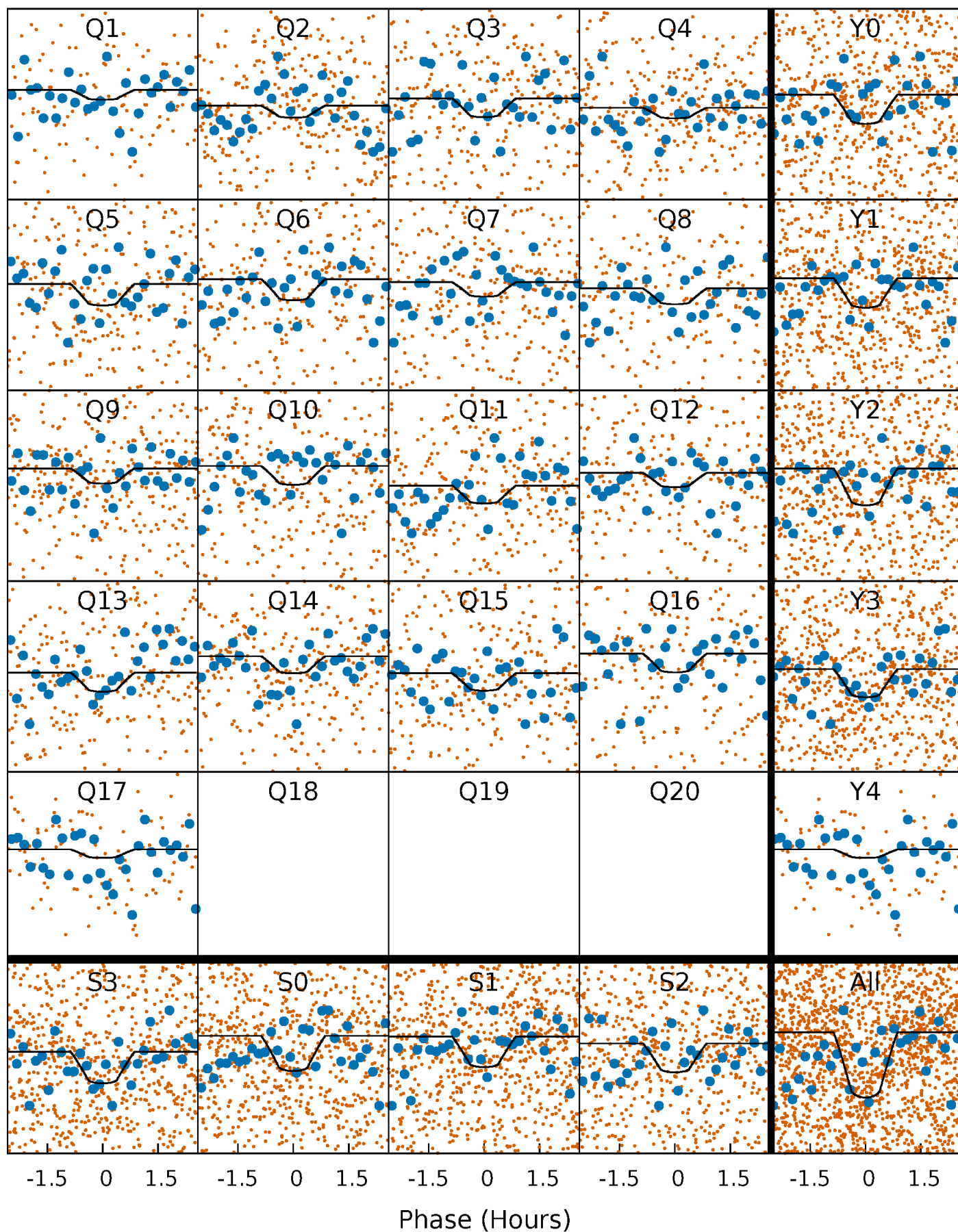
PDC Quarter-Phased Transit Curves

TCE 009405865-02 P= 2.688062 Days $T_0=134.104001$ (BKJD)



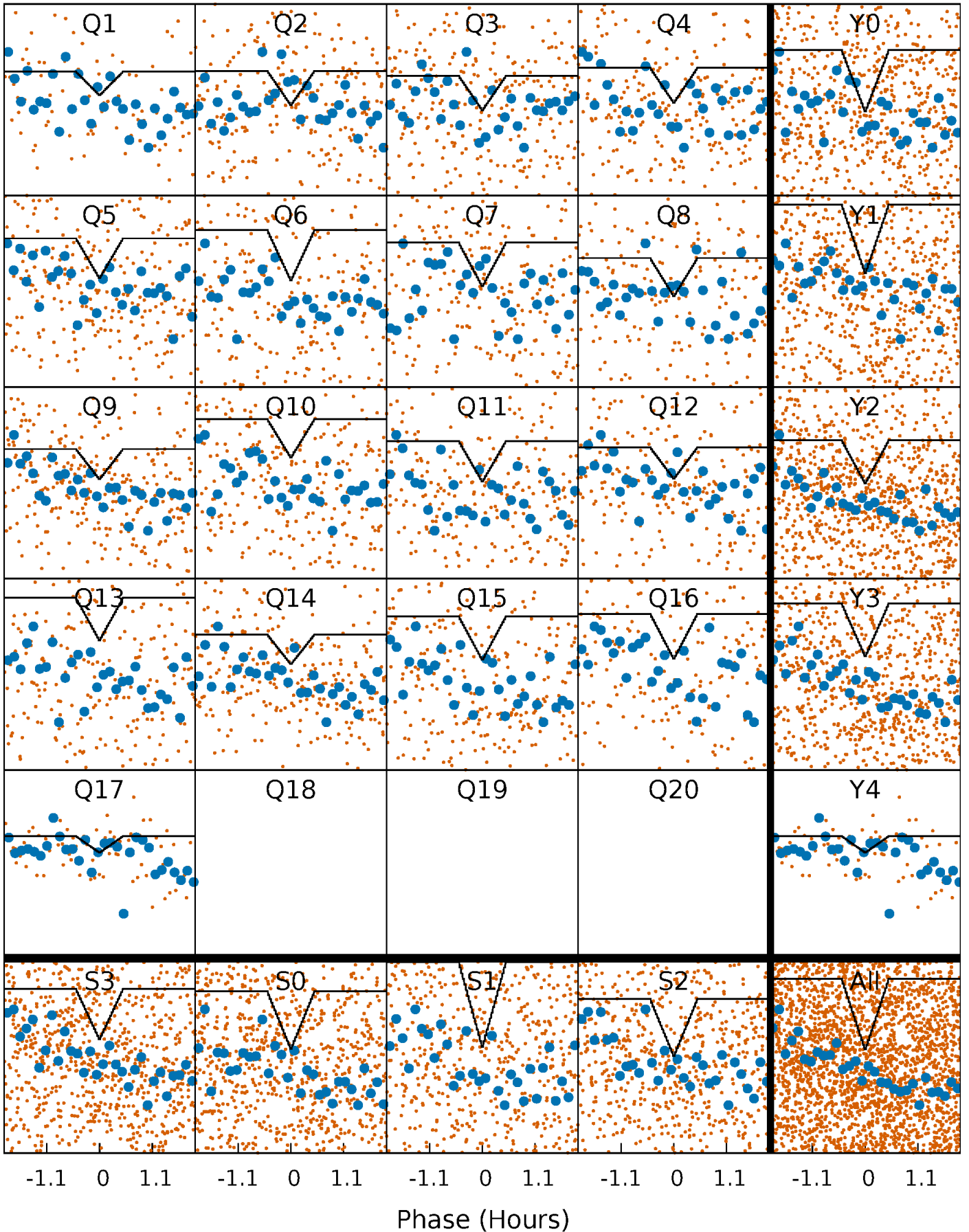
DV Quarter-Phased Transit Curves

TCE 009405865-02 P= 2.688062 Days $T_0=134.104001$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

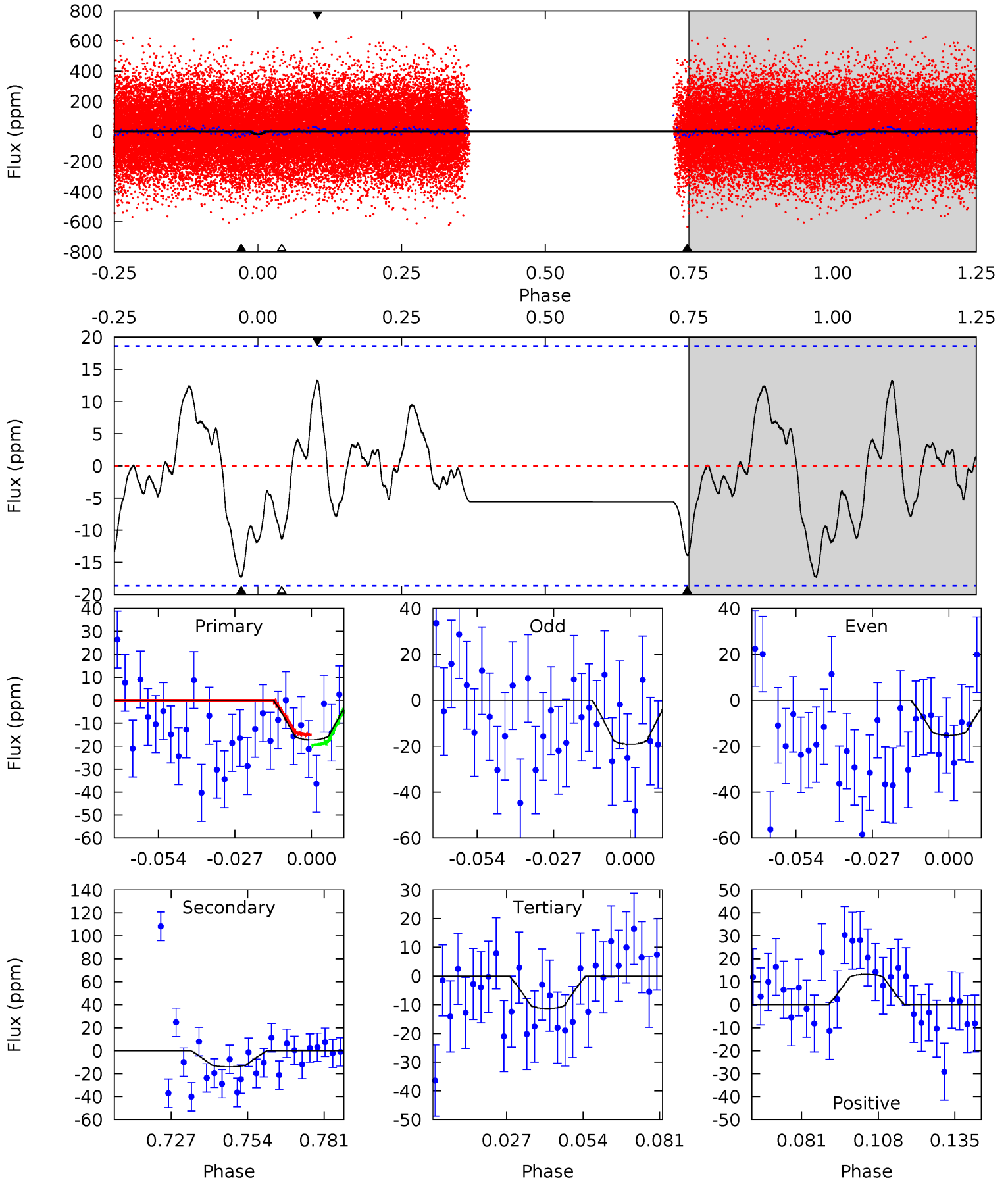
TCE 009405865-02 P= 2.687961 Days $T_0=134.096754$ (BKJD)



DV Model-Shift Uniqueness Test

009405865-02, P = 2.688062 Days, E = 131.415939 Days

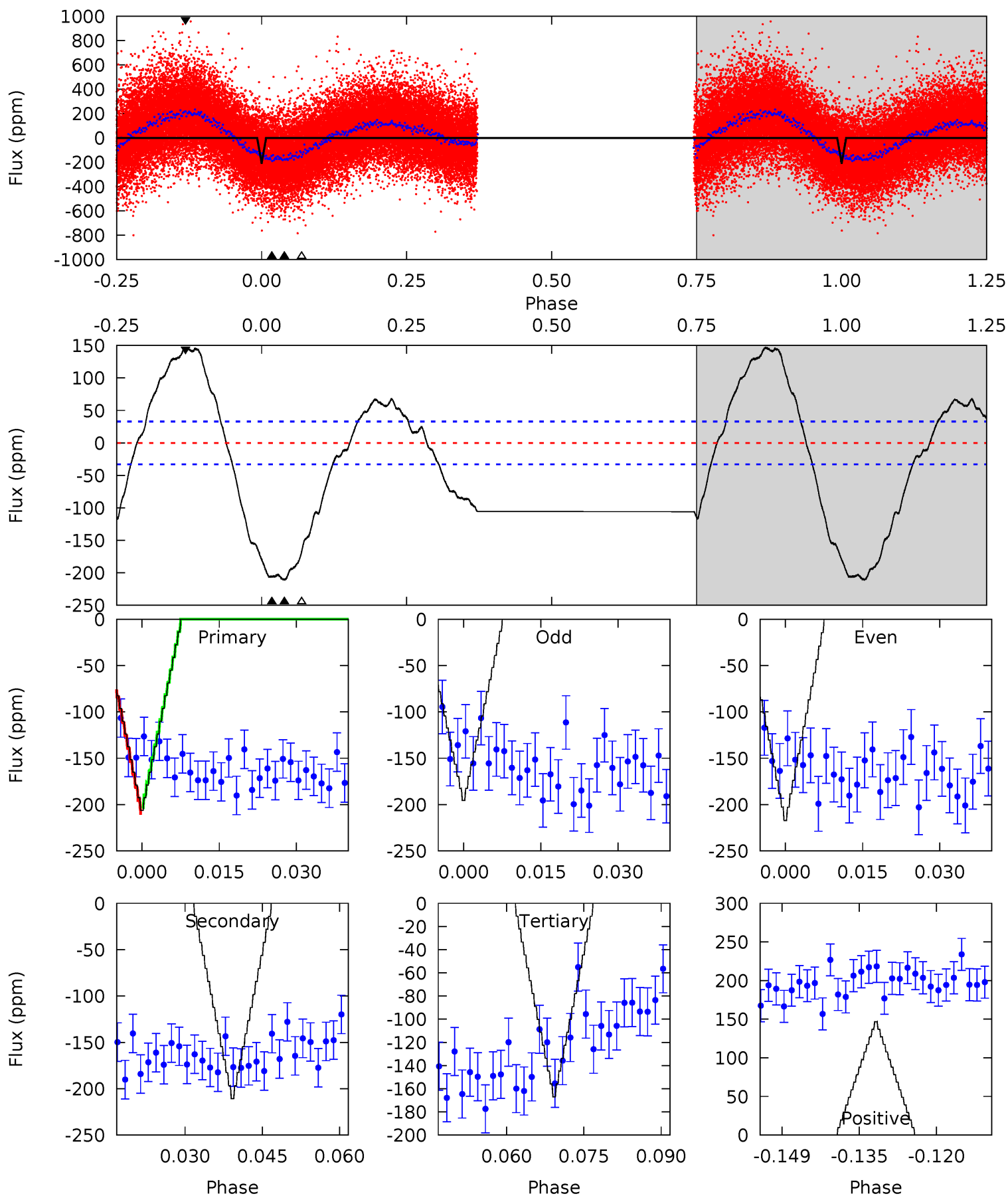
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.48	3.62	2.93	3.44	4.83	2.21	1.42	1.55	1.04	0.69	0.18	0.51	0.99	0.43	0.57



Alt Model-Shift Uniqueness Test

009405865-02, P = 2.687961 Days, E = 131.408793 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
31.0	31.7	25.1	22.1	4.95	2.43	13.4	5.91	8.98	6.58	9.65	1.63	1.05	0.41	0.46



Stellar Parameters For KIC 009405865

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7193^{+200}_{-300}	$4.188^{+0.128}_{-0.192}$	$-0.200^{+0.250}_{-0.350}$	$1.580^{+0.501}_{-0.308}$	$1.409^{+0.218}_{-0.218}$	$0.503^{+0.323}_{-0.267}$
	+3%/-4%	+3%/-5%	+125%/-175%	+32%/-19%	+15%/-15%	+64%/-53%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009405865-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-14 ± 4	$1.08^{+0.46}_{-0.47}$	2730^{+202}_{-180}	5528^{+1841}_{-848}	12^{+25}_{-6}
Alt.	-211 ± 7	$1.82^{+0.56}_{-0.53}$	2724^{+213}_{-172}	8847^{+2188}_{-1167}	63^{+63}_{-26}

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

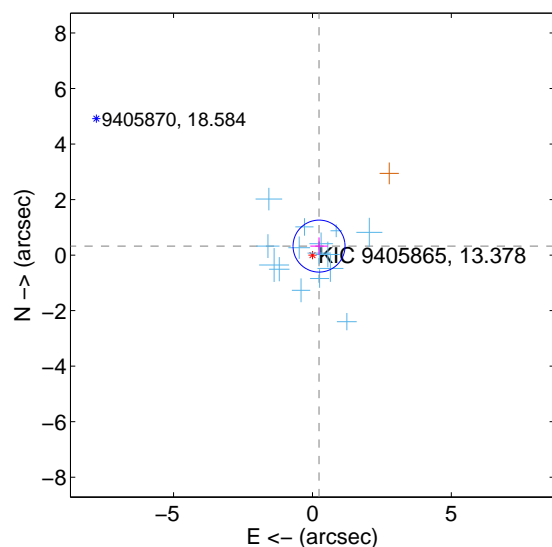
Supplemental centroid analysis for 009405865-02. Kepler magnitude: 13.38. Transit SNR 5.59

There are 15 quarters with good PRF difference image offsets

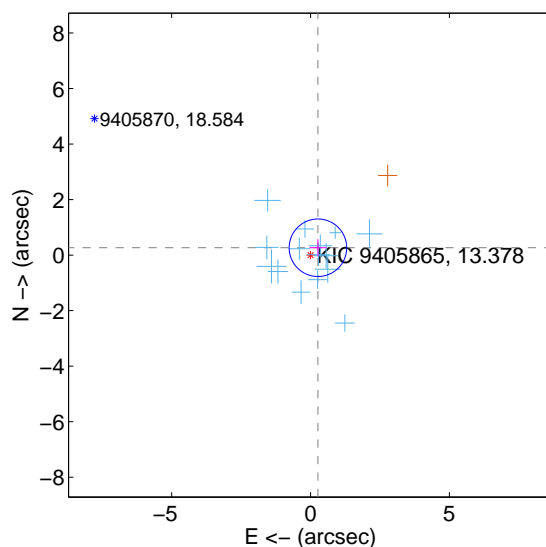
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.402 ± 0.312	1.29	-0.238 ± 0.312	0.324 ± 0.312
PRF-fit source offset from KIC position	0.376 ± 0.345	1.09	-0.267 ± 0.309	0.265 ± 0.311
photometric centroid source offset	1.63 ± 1.88	0.87	0.71 ± 1.87	1.47 ± 1.88

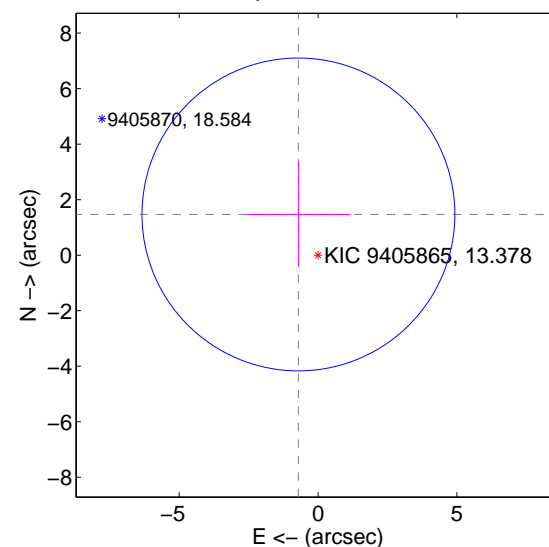
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

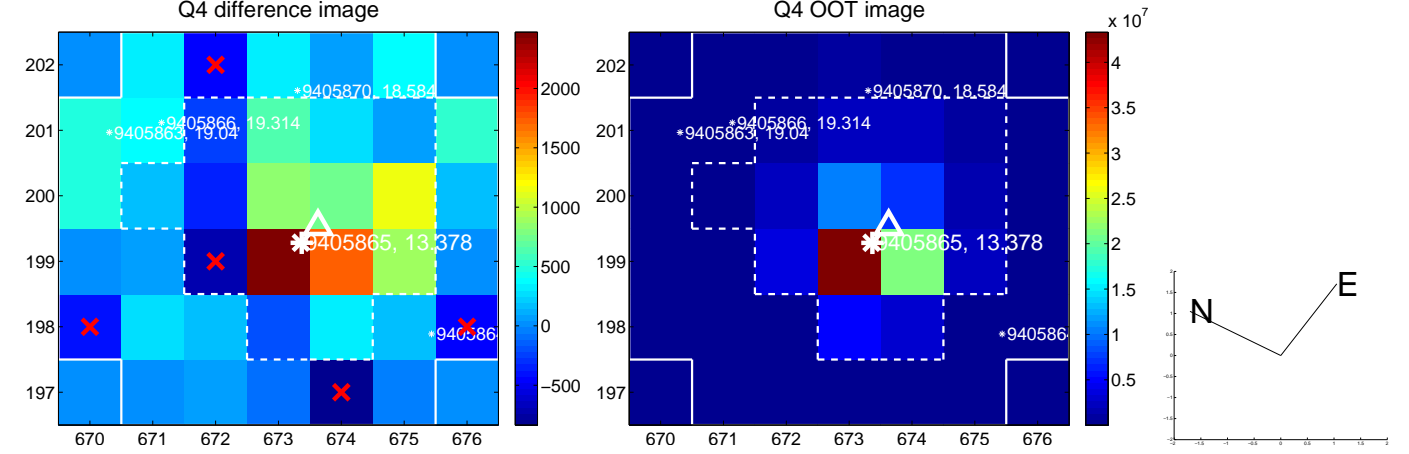
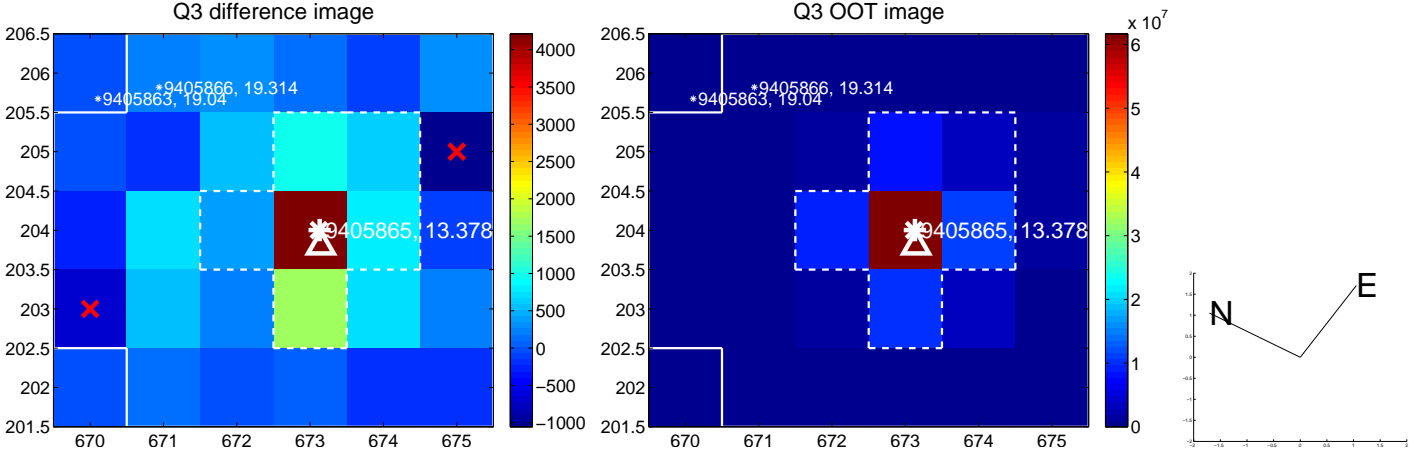
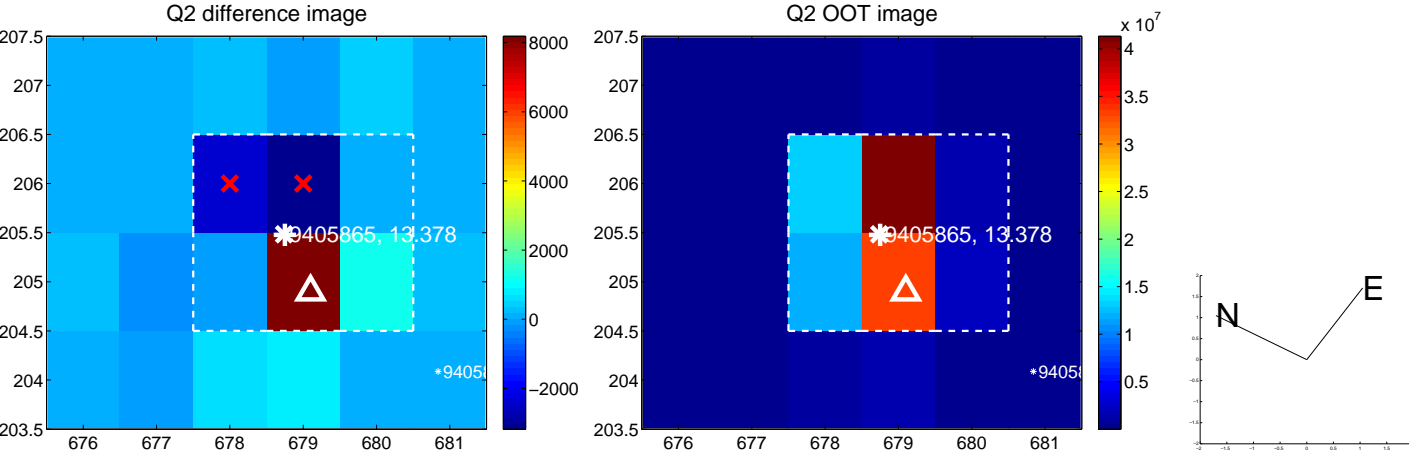
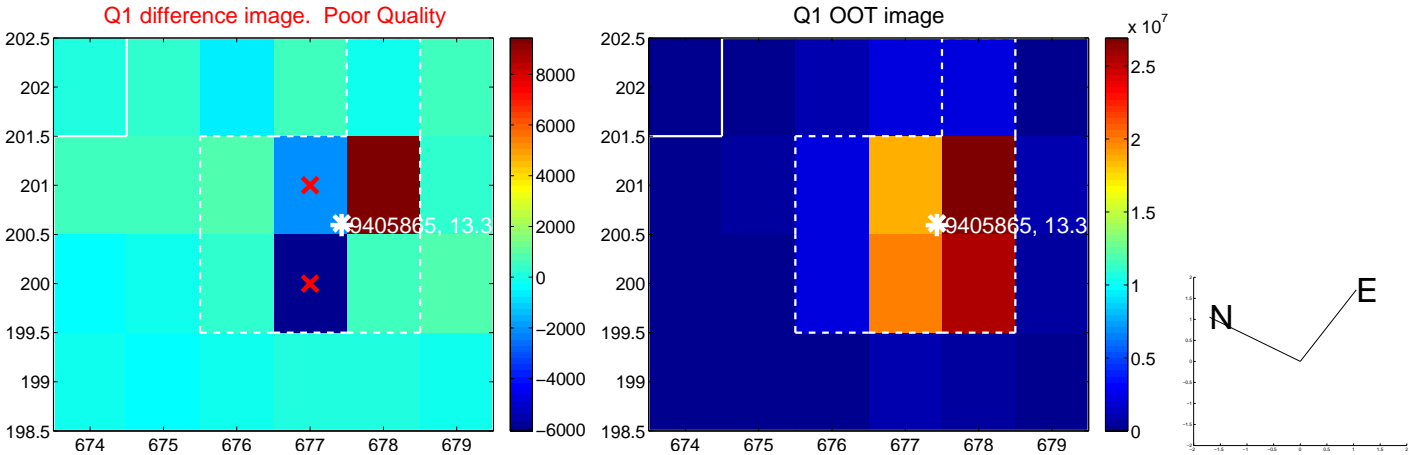


offset from photometric centroids

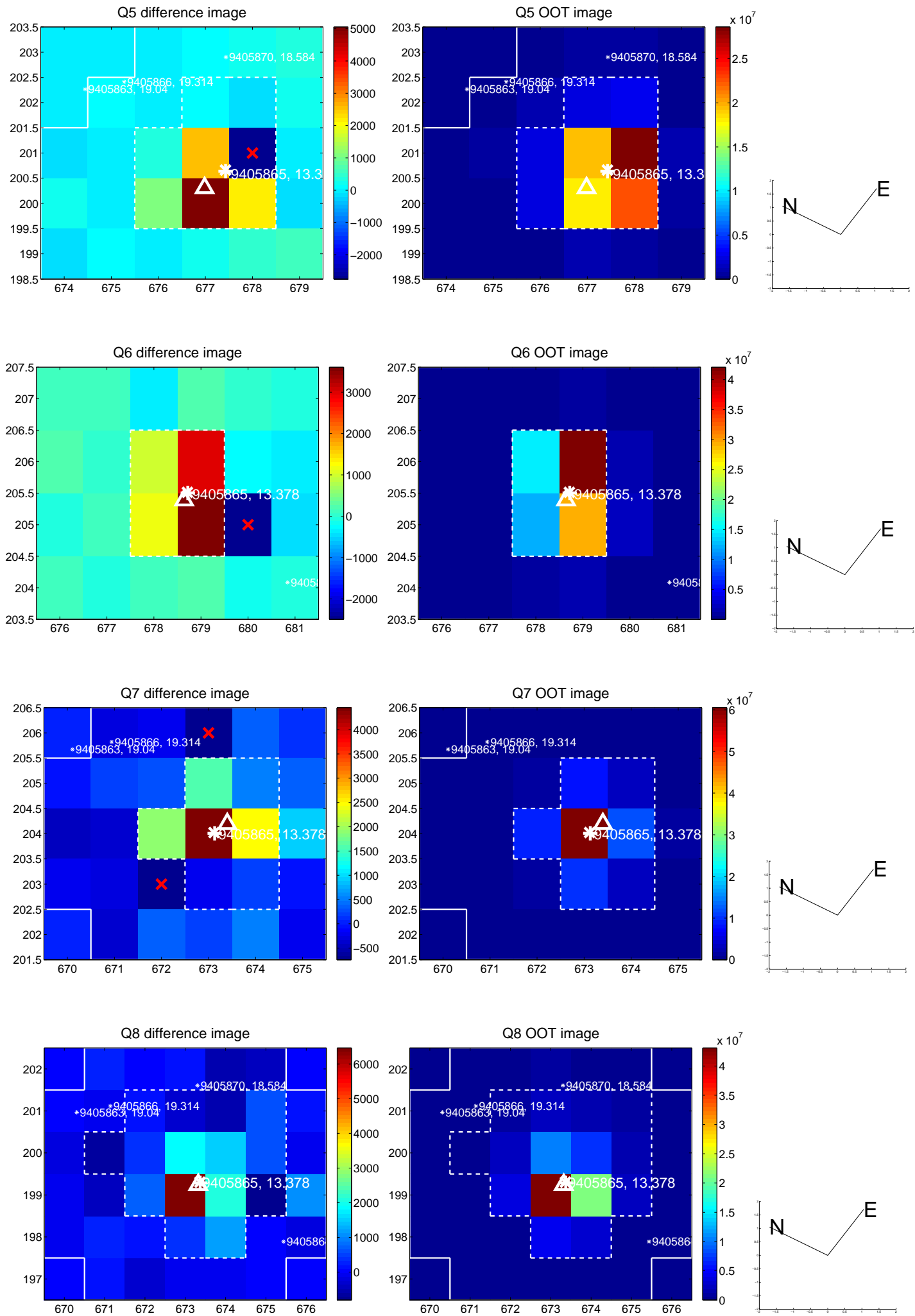


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

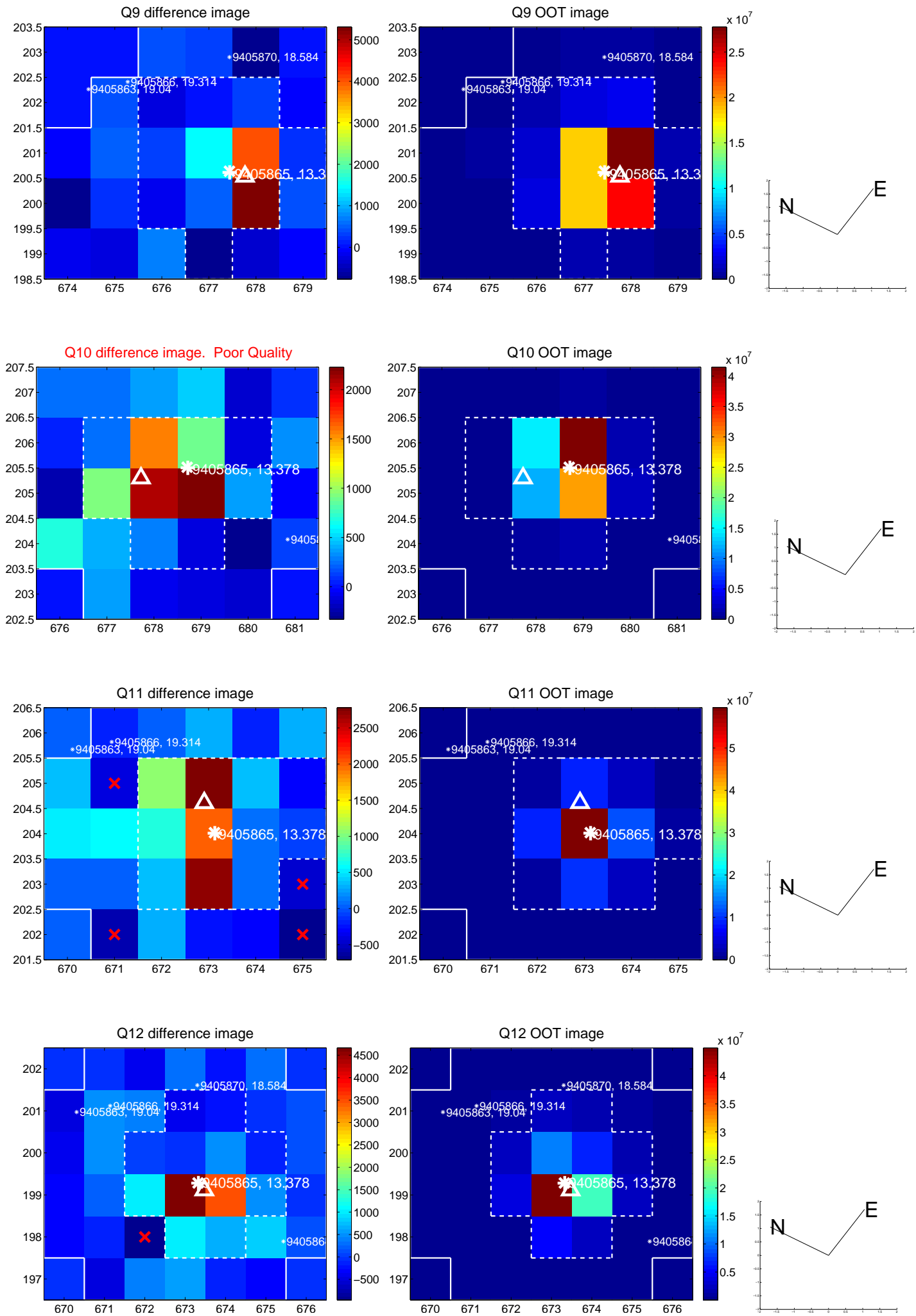
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



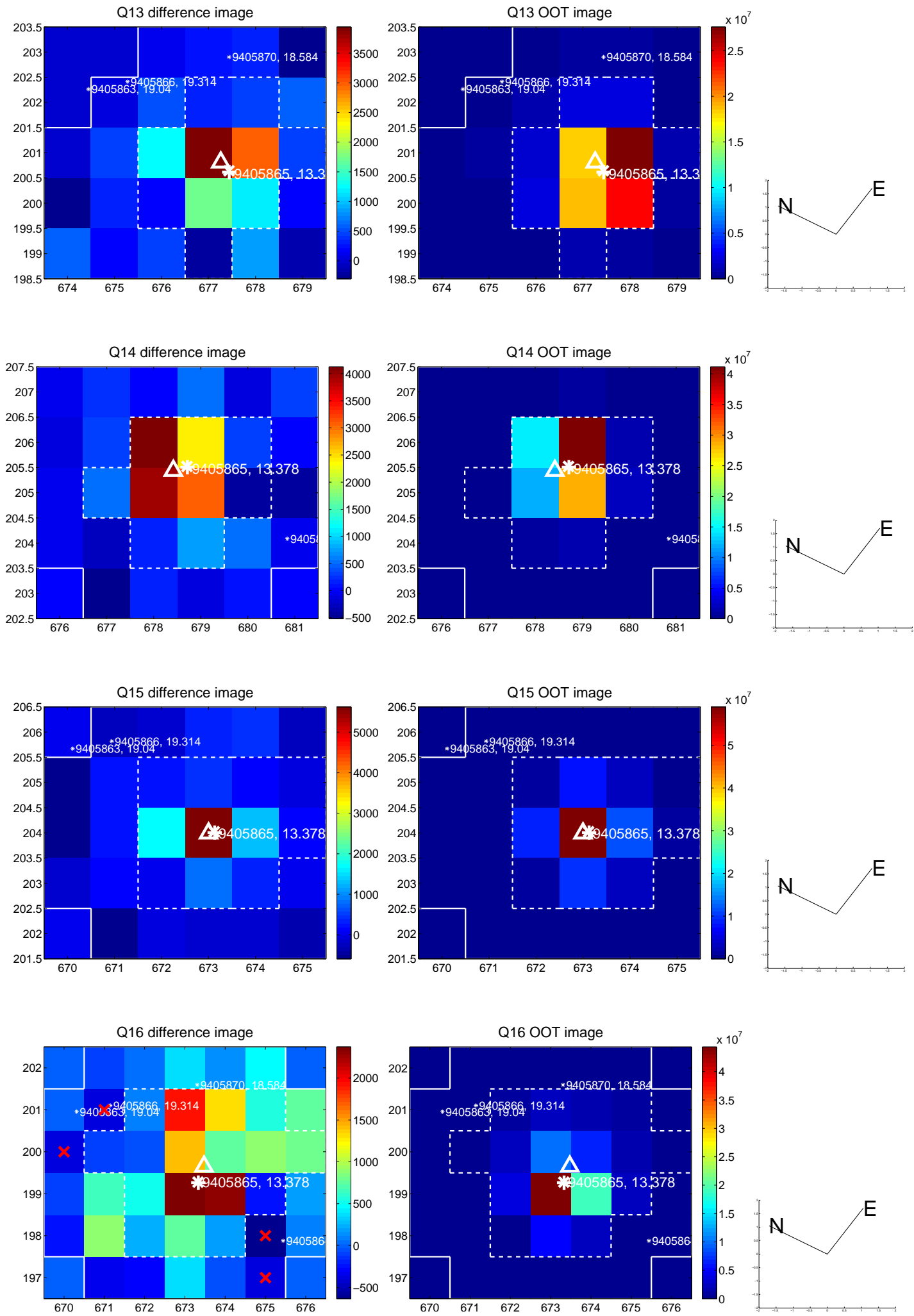
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



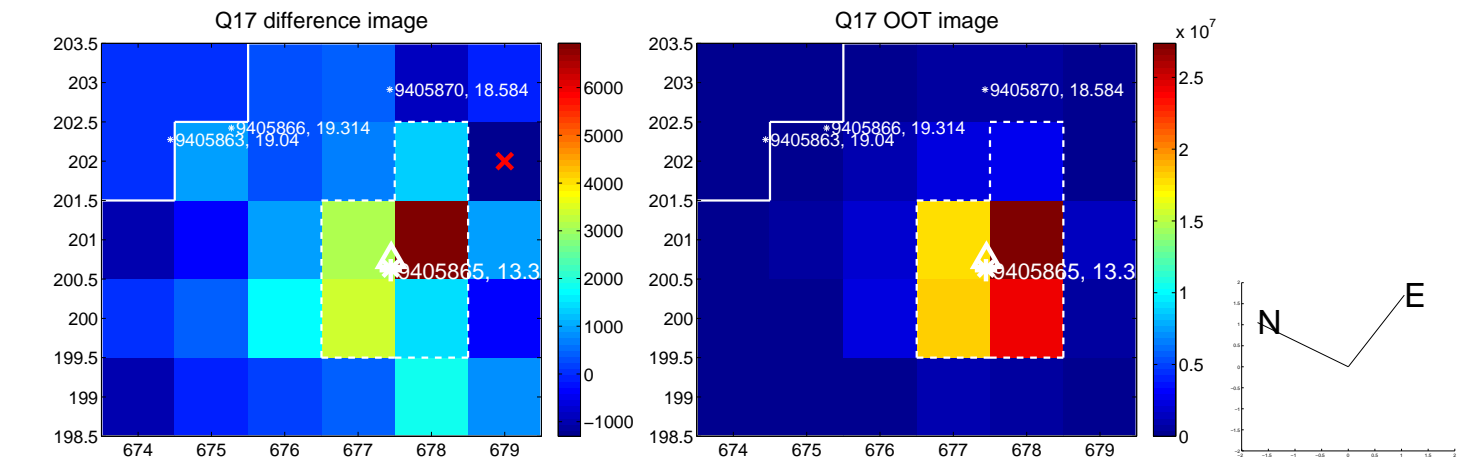
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



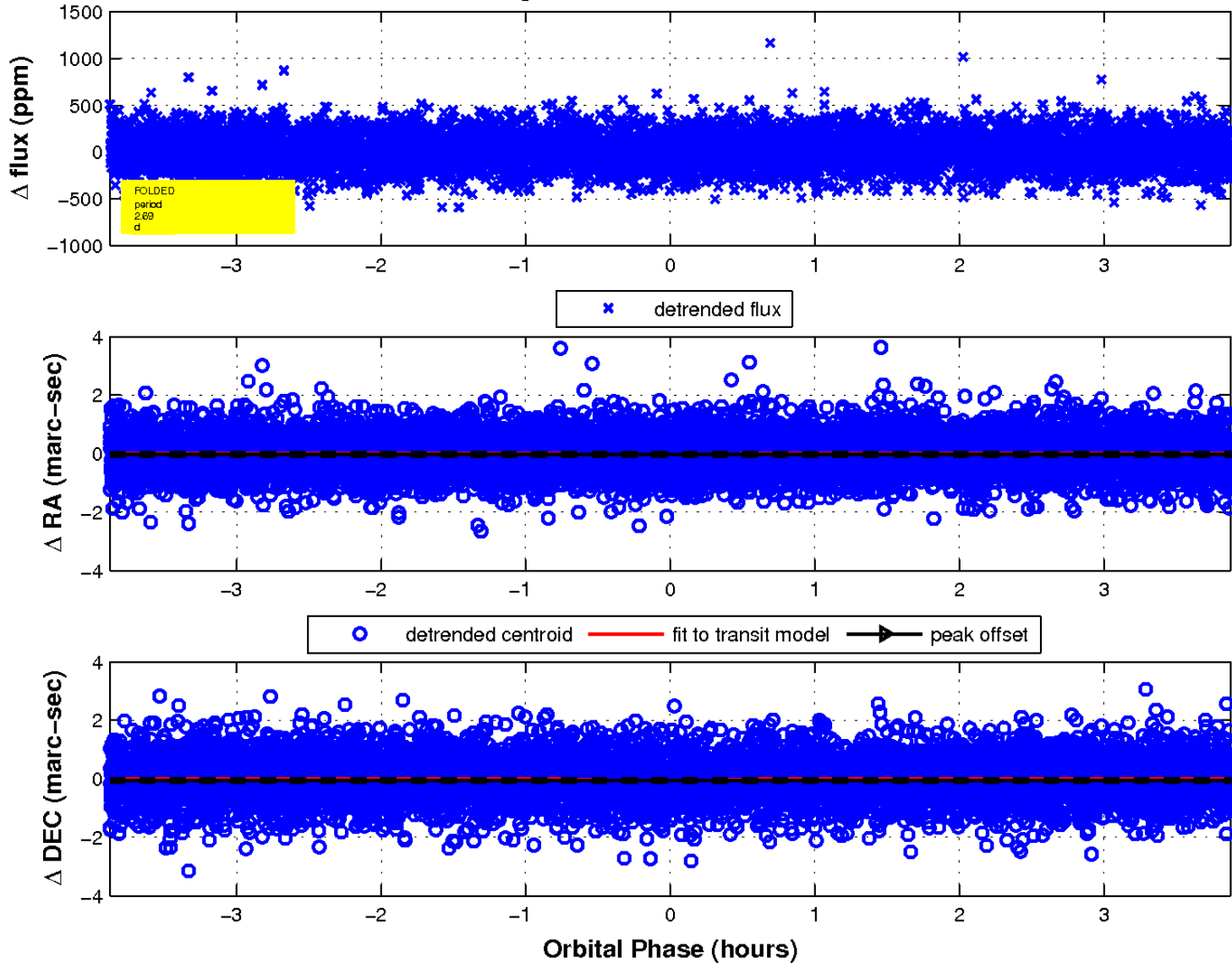
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

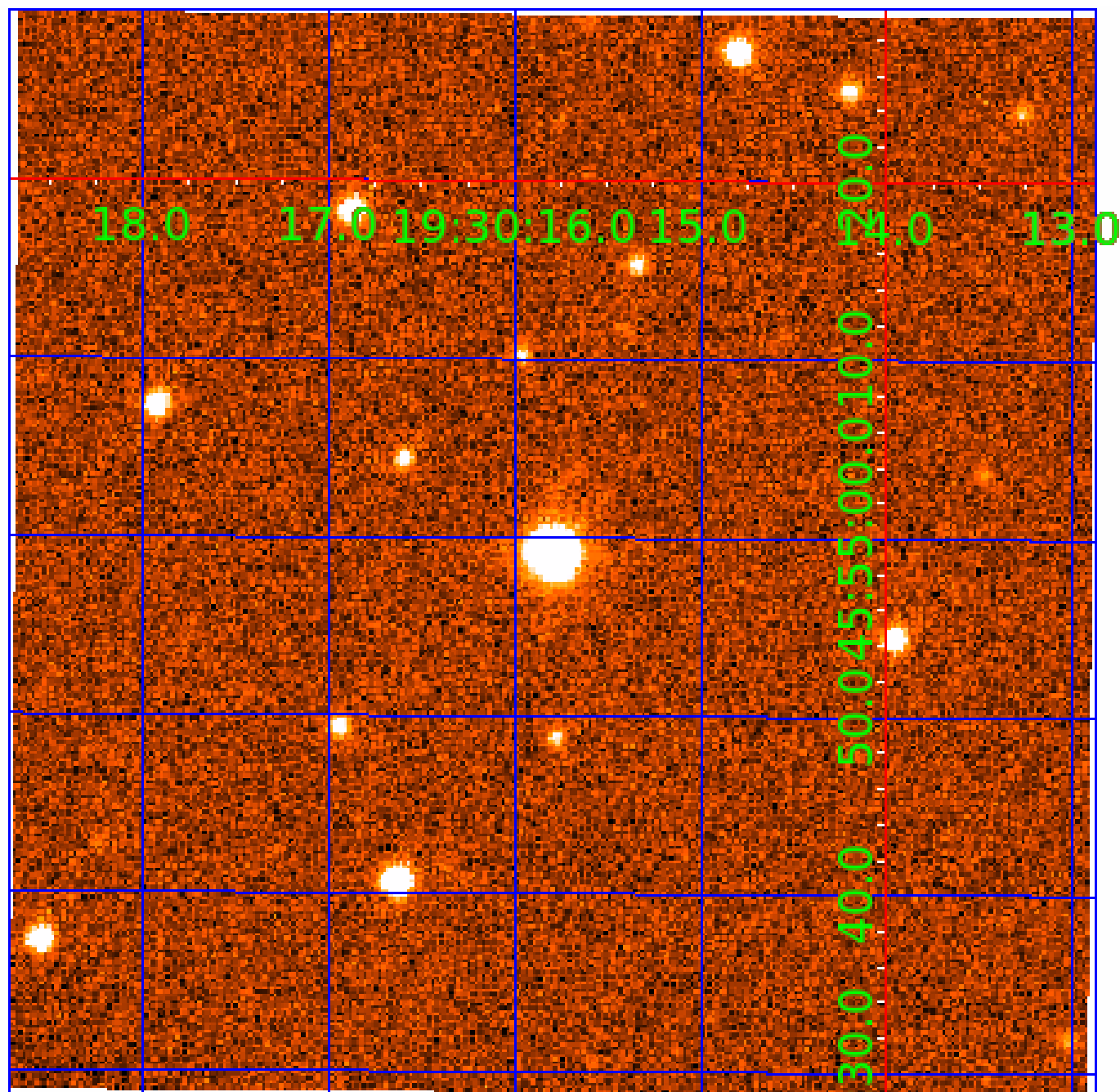


fluxWeightedCentroids, Planet 2 of 6



UKIRT Image

Declination



KIC 009405865

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})
009405865-01	OBS	No	2.687938	132.916423	32.9	7.937	11.2	8.9	1.58	7193	1.16	3334.88
009405865-02	OBS	No	2.688062	134.104001	33.6	1.293	11.5	5.6	1.58	7193	1.07	3334.68
009405865-03	OBS	No	2.688136	134.075997	40.7	8.228	12.8	7.5	1.58	7193	1.17	3334.55
009405865-04	OBS	No	2.687889	133.511935	49.4	9.086	12.4	14.2	1.58	7193	1.29	3334.96
009405865-05	OBS	No	61.502893	190.200197	187.7	6.572	8.2	7.1	1.58	7193	2.37	51.34
009405865-06	OBS	No	115.844151	210.325697	347.2	2.542	7.5	8.0	1.58	7193	3.38	22.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009405865-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009405865-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—HALO_GHOST
009405865-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD
009405865-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFFS
009405865-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_MEAS
009405865-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

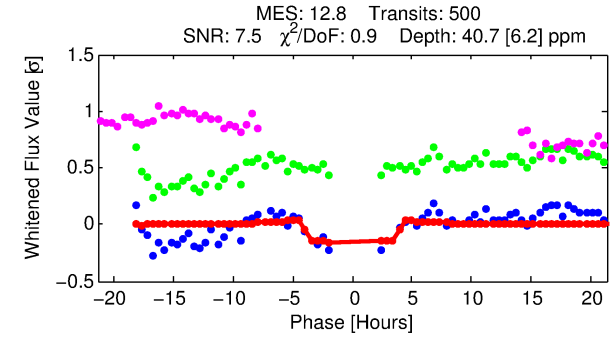
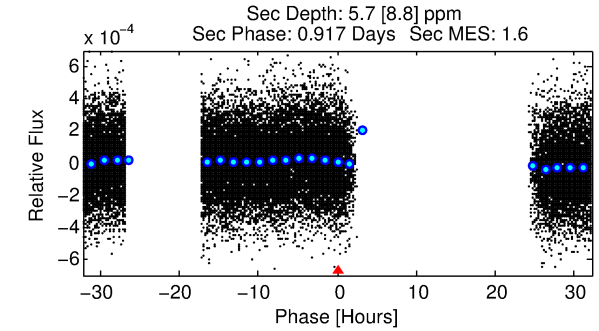
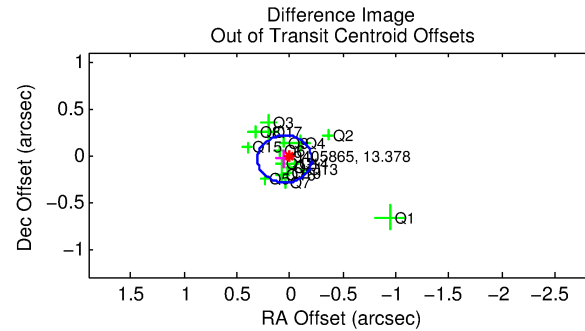
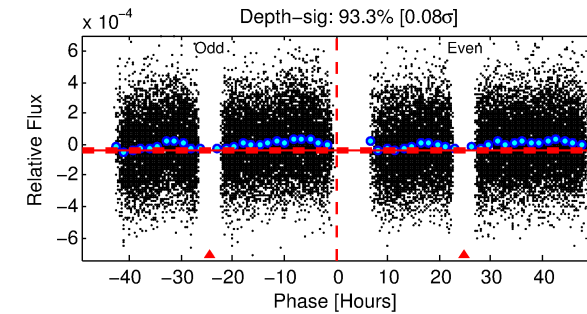
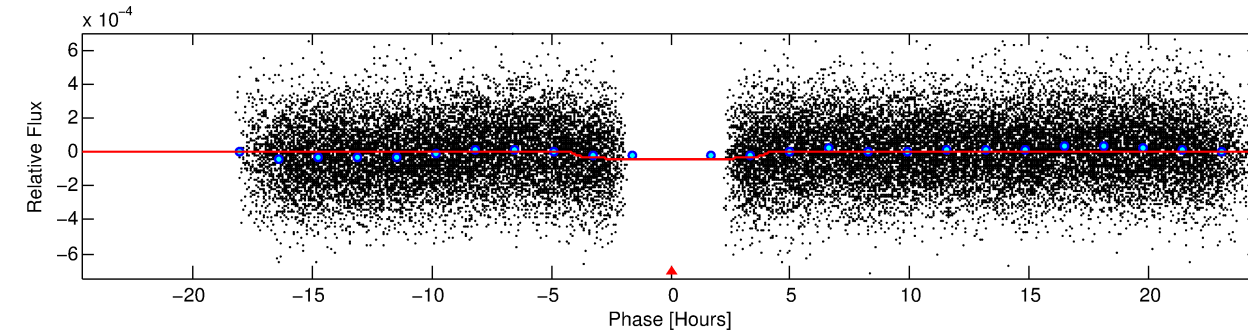
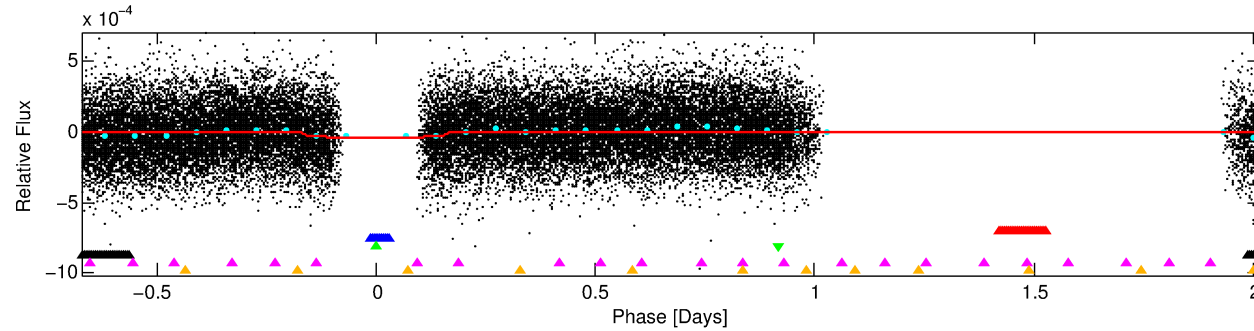
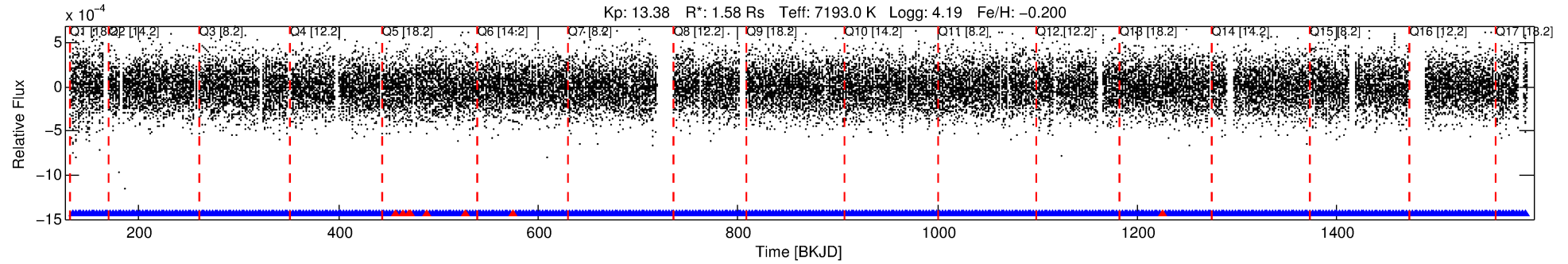
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009405865-03

No Significant Match Found

DV One-Page Summary

KIC: 9405865 Candidate: 3 of 6 Period: 2.688 d



DV Fit Results:

Period = 2.68814 [0.00002] d
Epoch = 134.0760 [0.0050] BKJD
Rp/R* = 0.0068 [0.0012]
a/R* = 1.45 [0.70]
b = 0.91 [0.19]
Seff = 3334.55 [1331.26]
Teq = 1938 [193] K
Rp = 1.17 [0.42] Re
a = 0.0424 [0.0109] AU
Ag = 4.08 [6.61] [0.47σ]
Teffp = 4258 [1690] K [1.36σ]

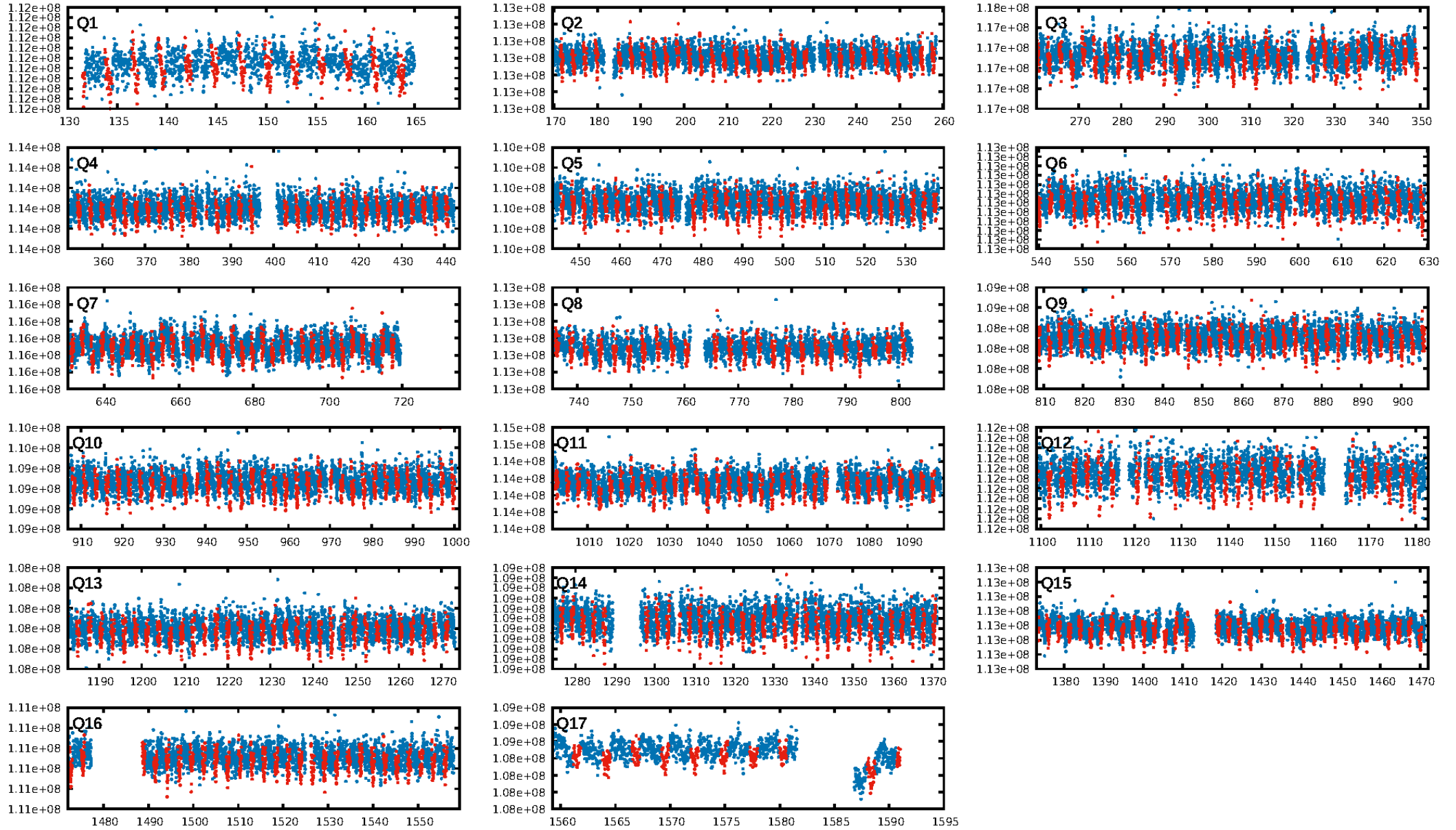
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: 100.0% [134.04σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 4.64e-43
RollingBand-fgt: 0.98 [469/477]
GhostDiagnostic-chr: 1.957
Centroid-sig: 15.9%
Centroid-so: 0.759 arcsec [1.11σ]
OotOffset-rm: 0.063 arcsec [0.74σ]
KicOffset-rm: 0.103 arcsec [1.20σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 0.00 [0/17]

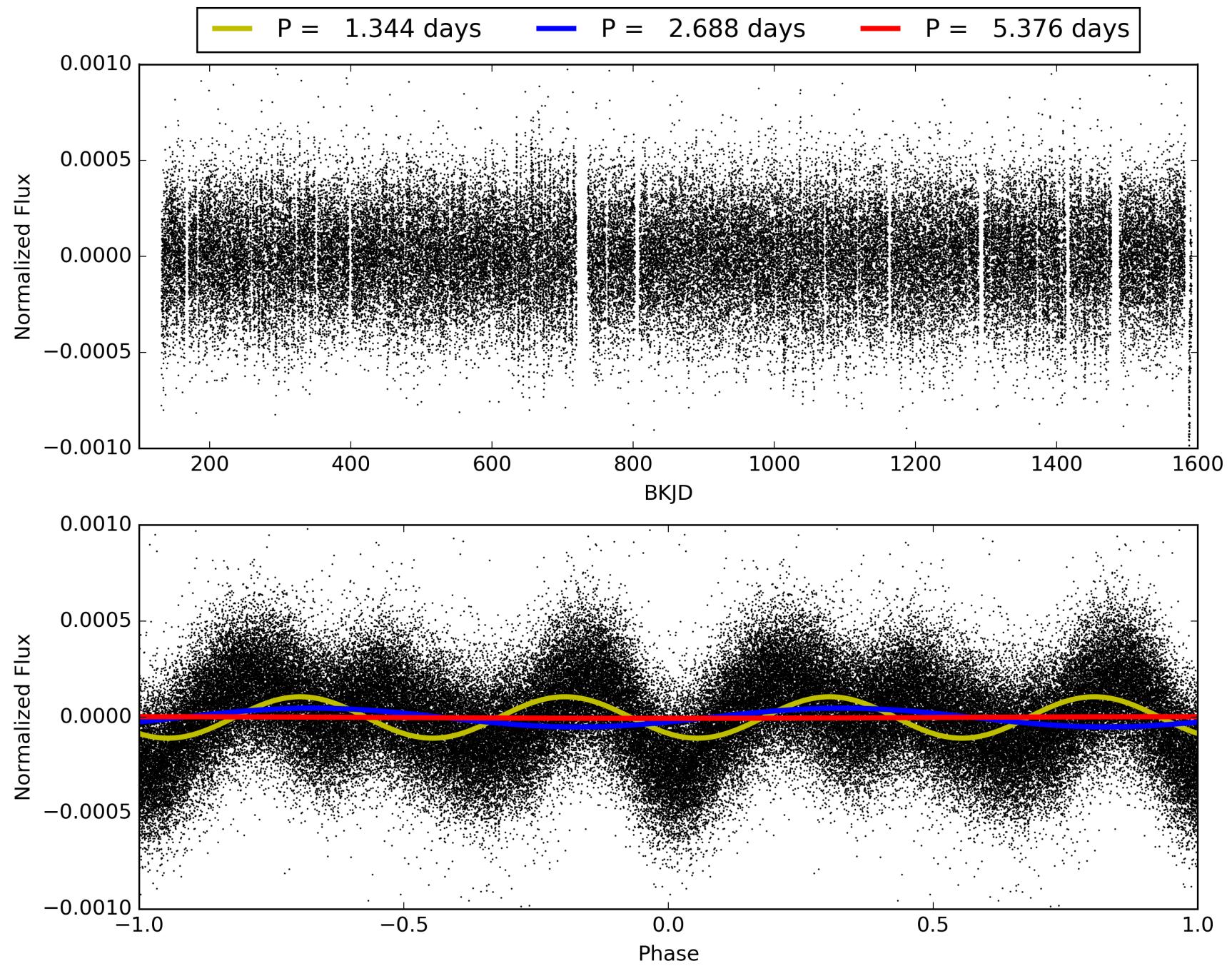
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 16:28:43 Z

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

TCE 009405865-03, PDC Light Curves

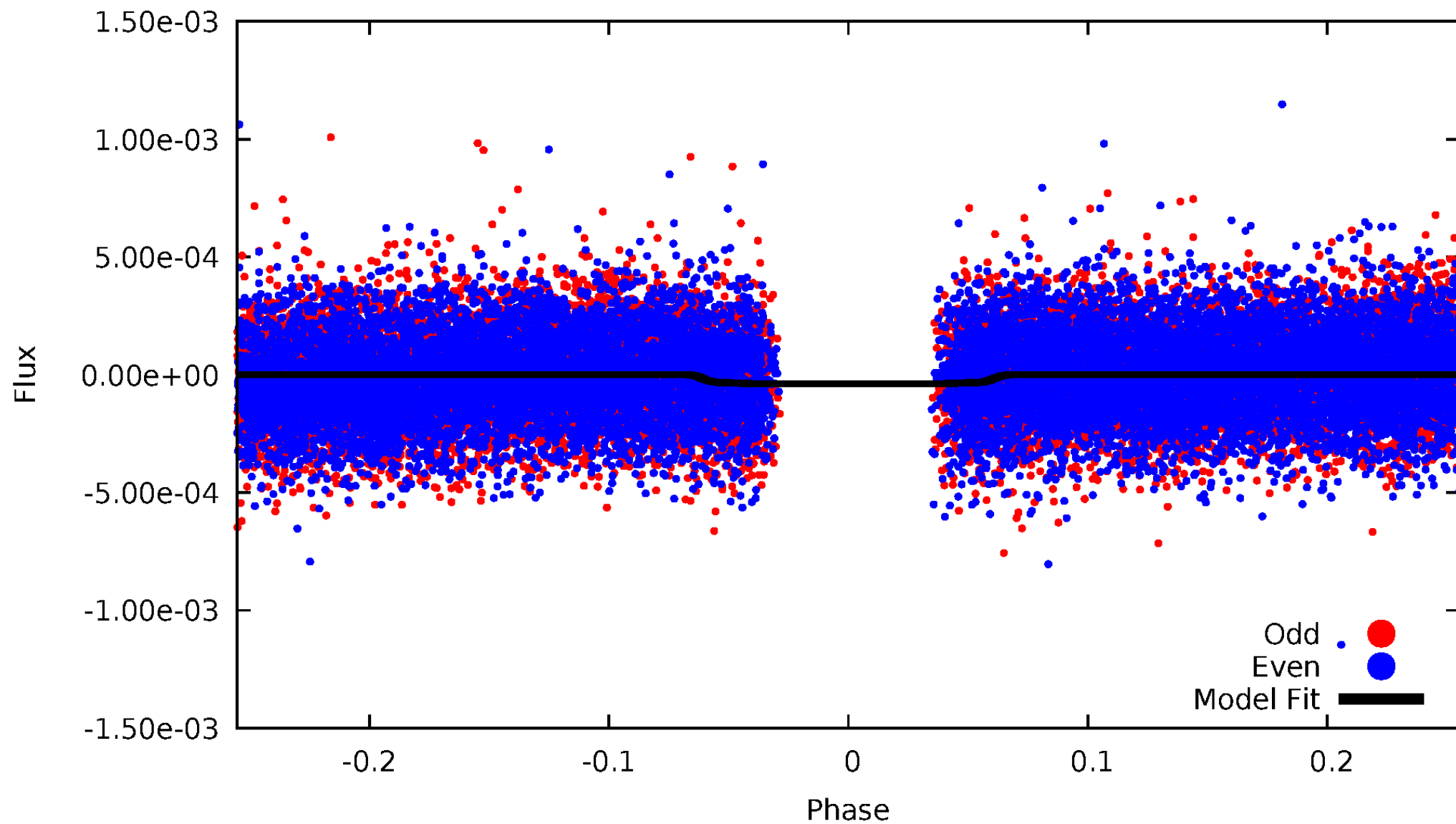


TCE 009405865-03



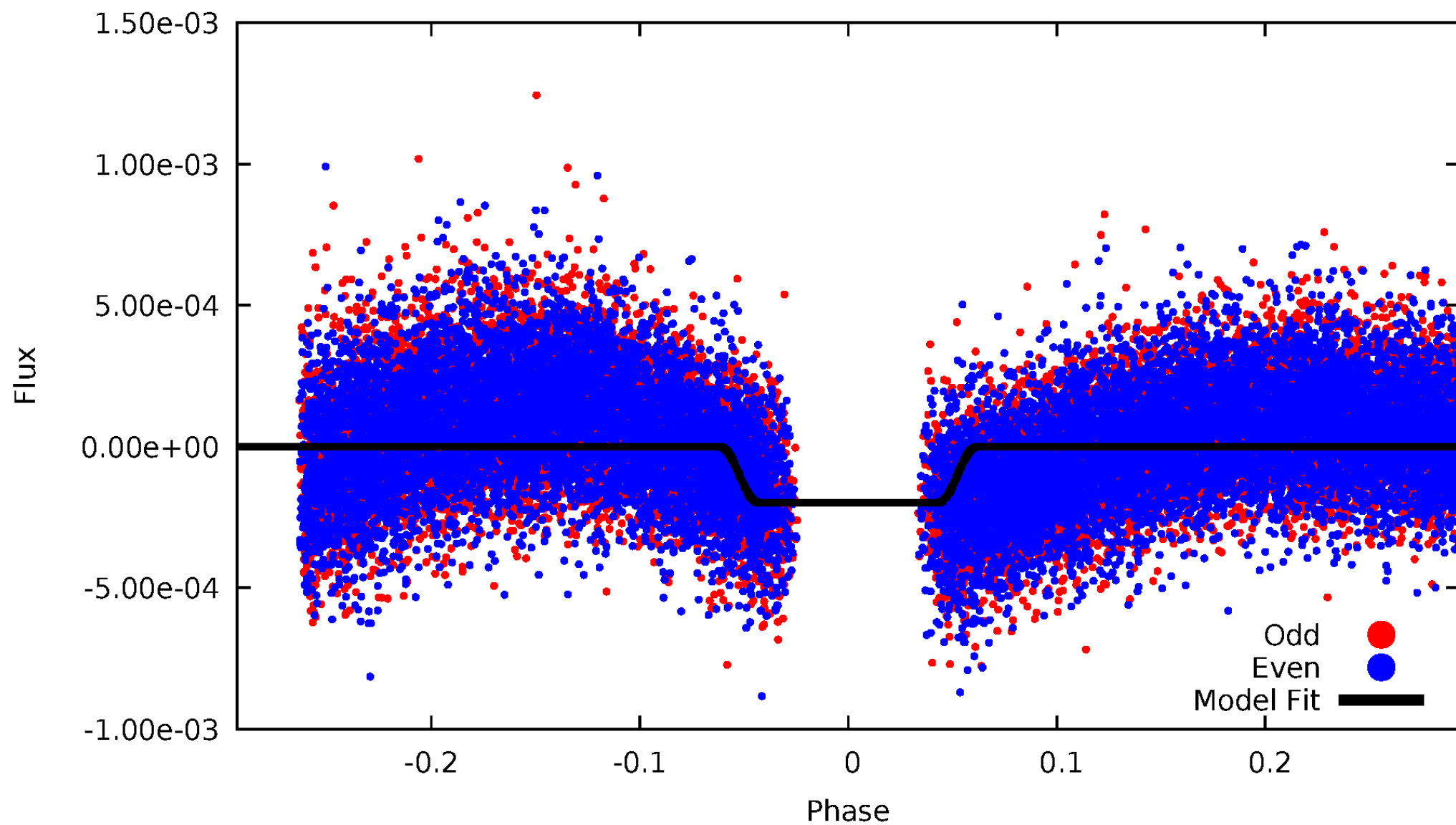
DV Odd/Even

TCE 009405865-03

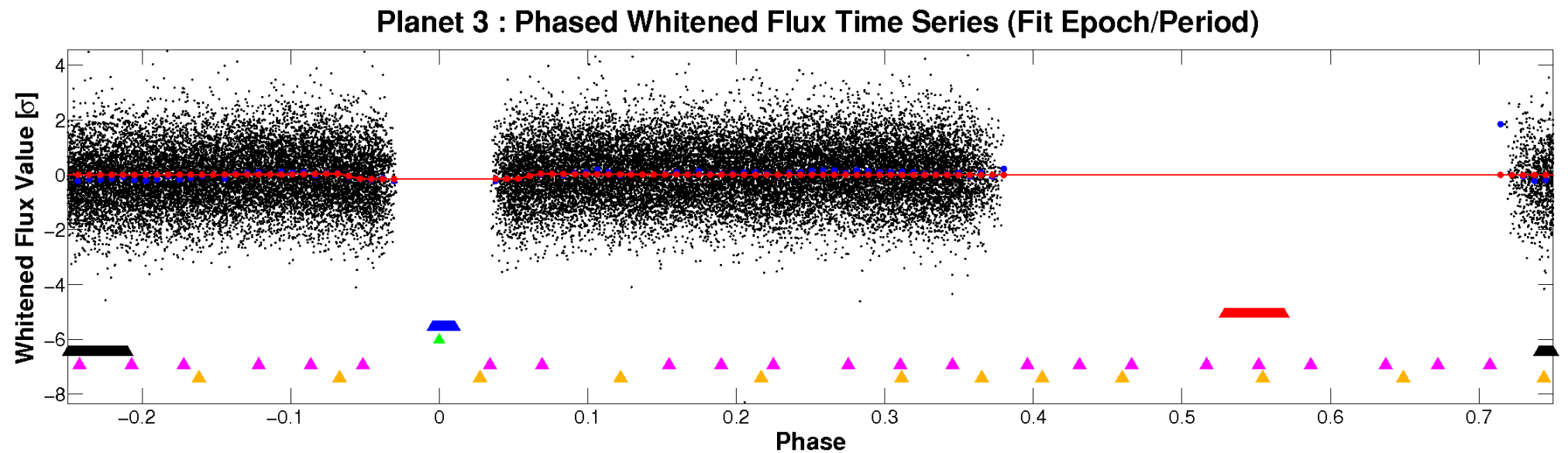
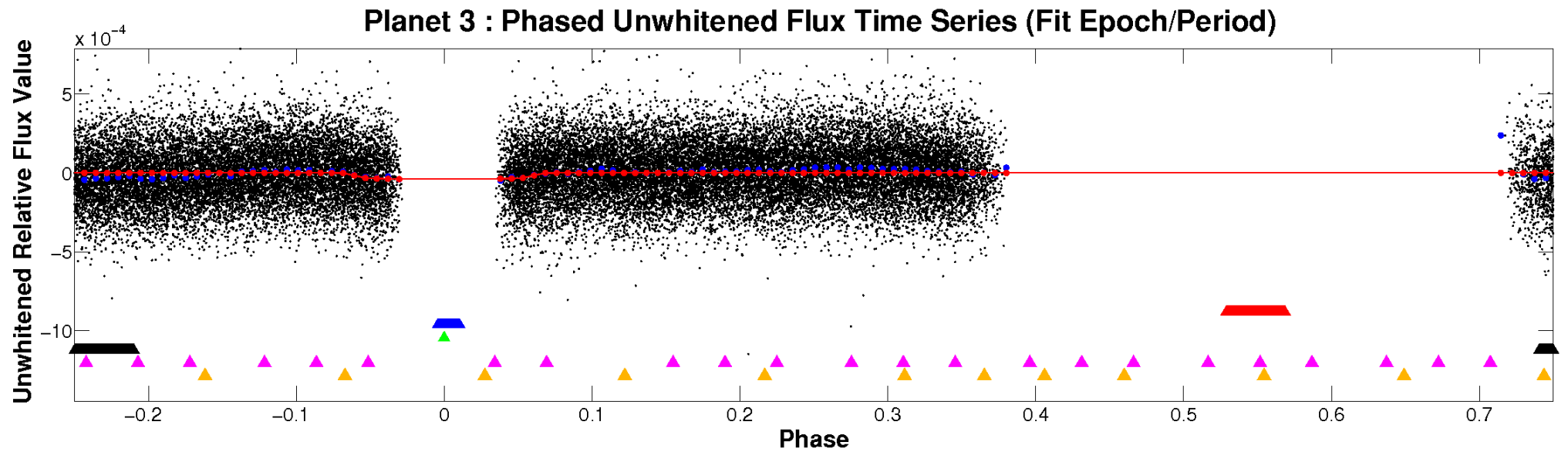


ALT Odd/Even

TCE 009405865-03

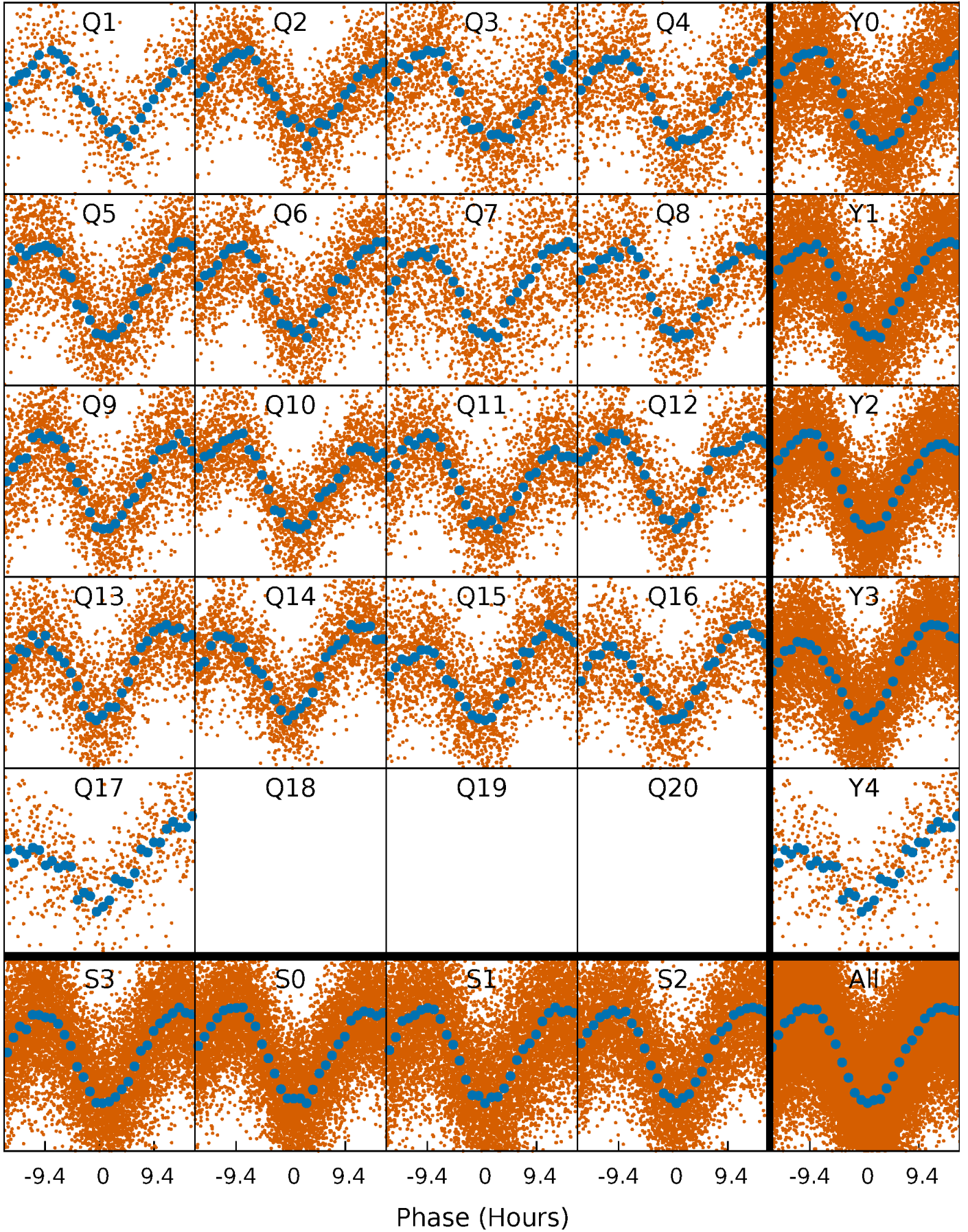


Non-Whitened Vs. Whitened Light Curve



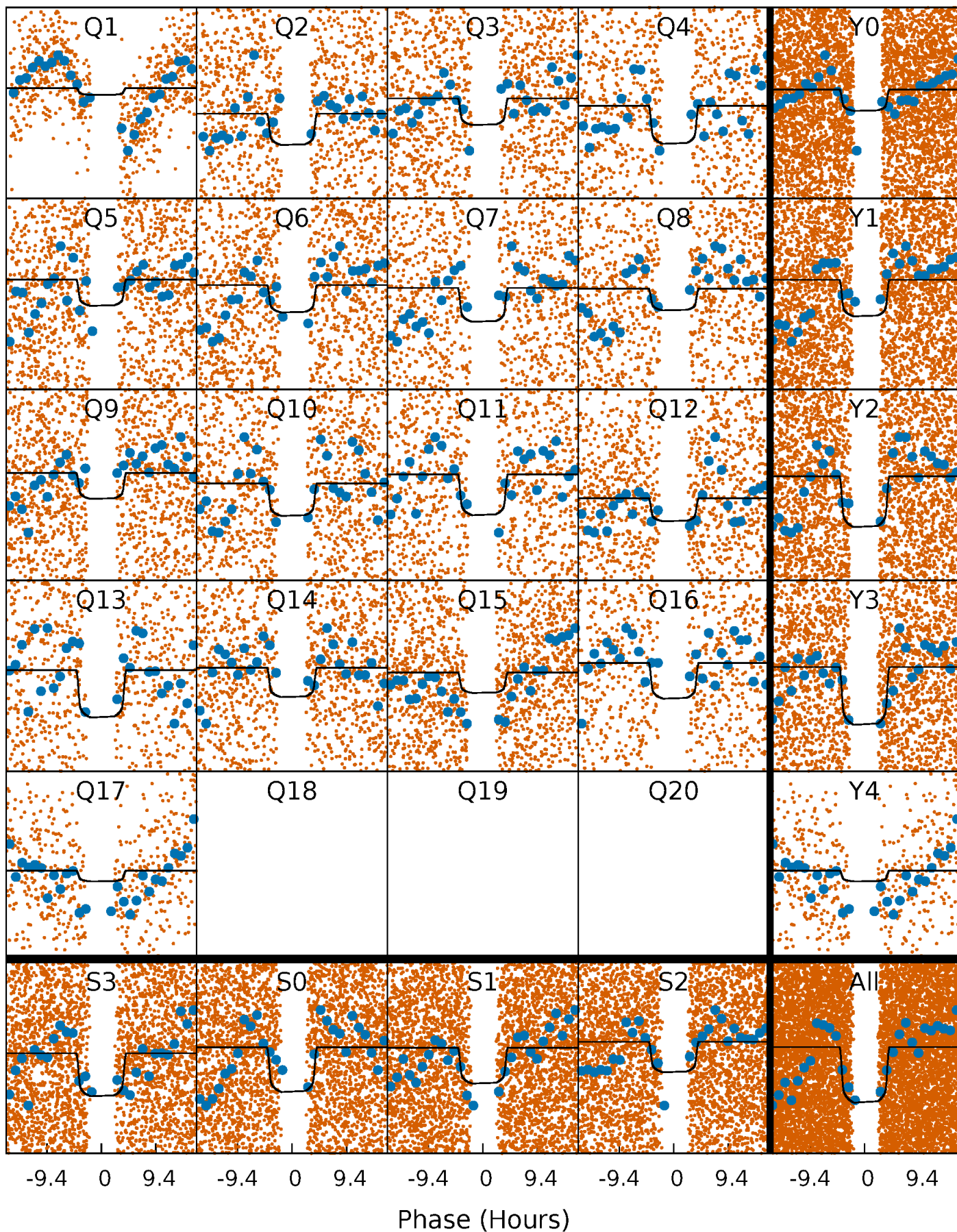
PDC Quarter-Phased Transit Curves

TCE 009405865-03 P= 2.688136 Days $T_0=134.075997$ (BKJD)



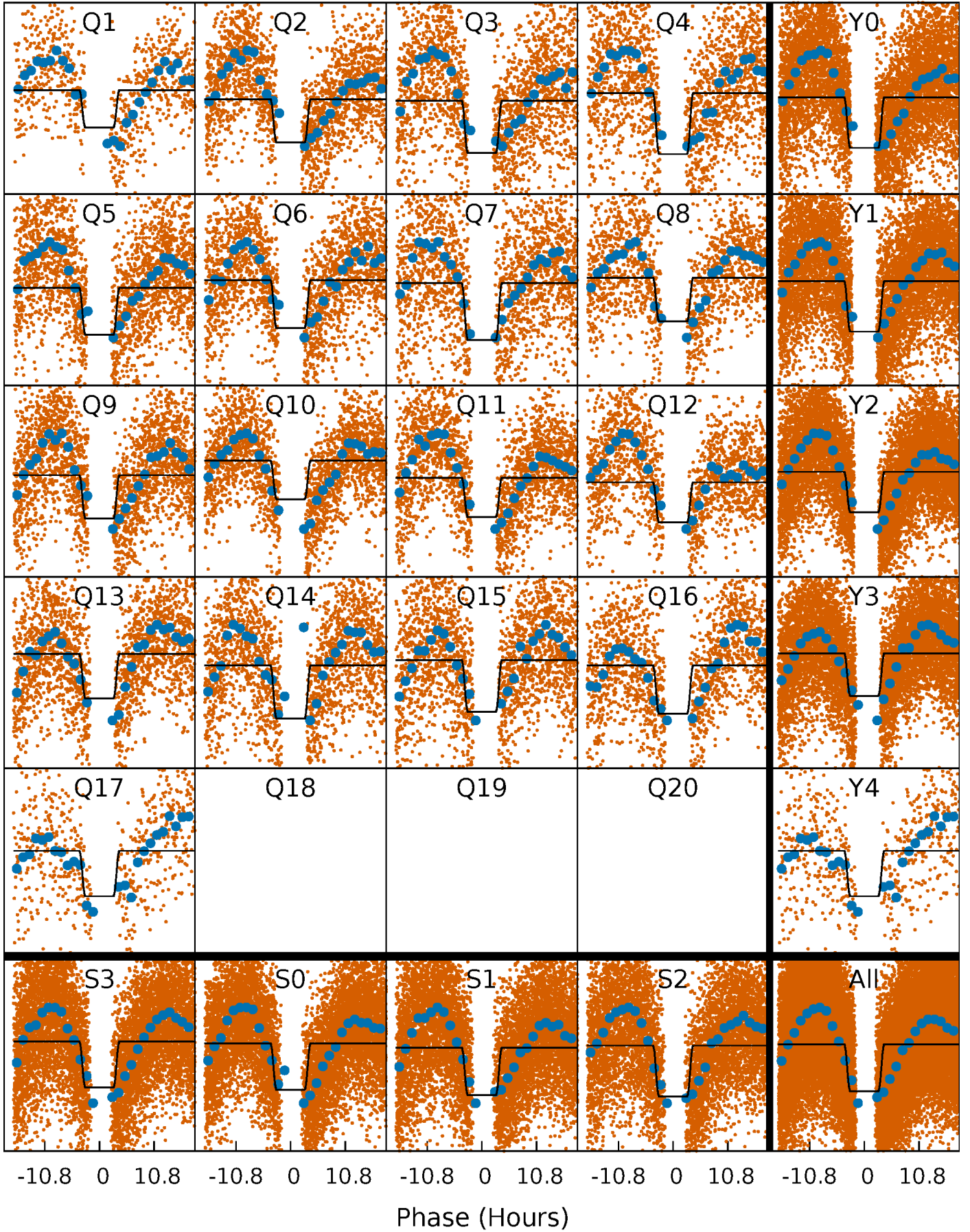
DV Quarter-Phased Transit Curves

TCE 009405865-03 P= 2.688136 Days $T_0=134.075997$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

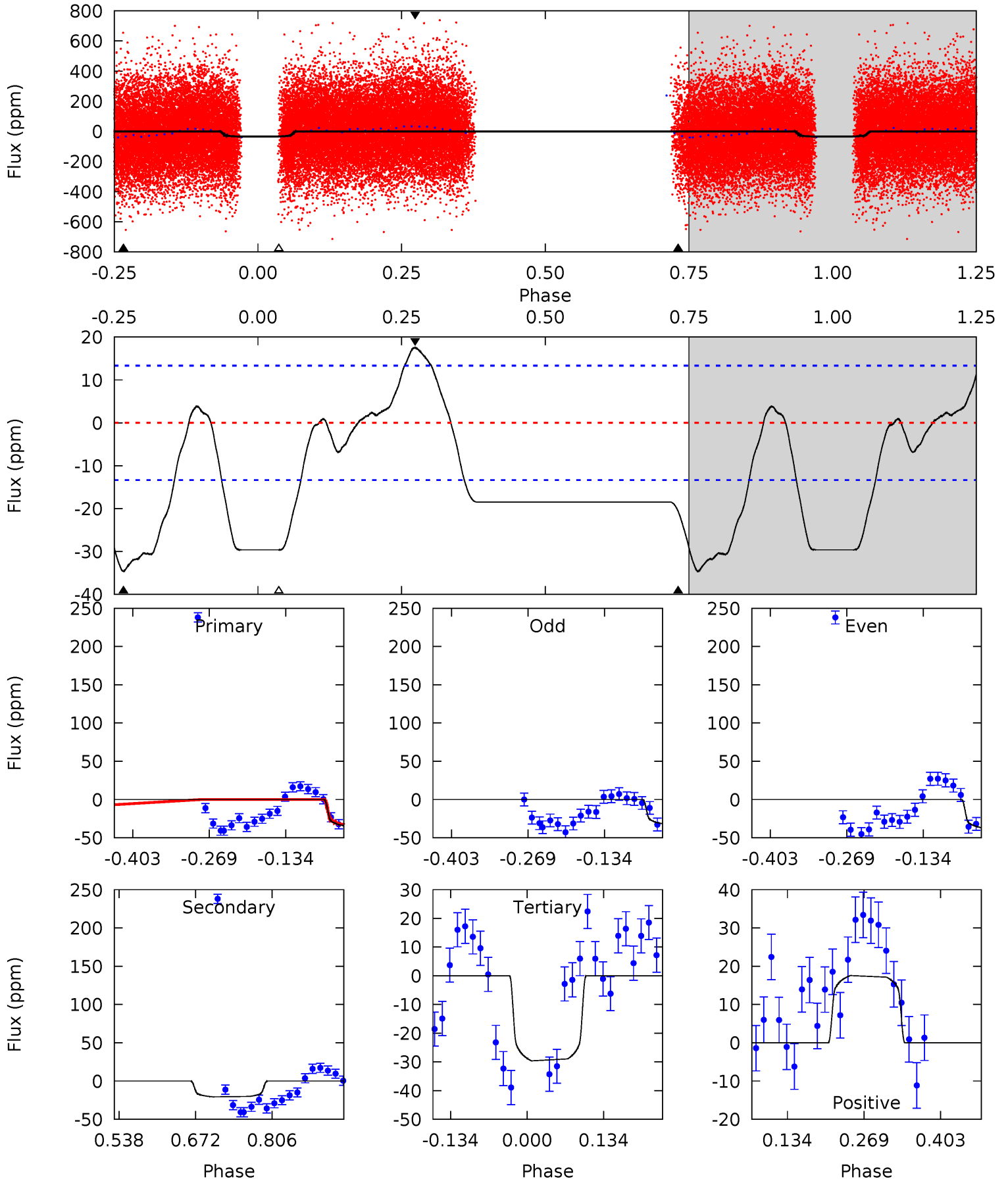
TCE 009405865-03 P= 2.687961 Days $T_0=134.119387$ (BKJD)



DV Model-Shift Uniqueness Test

009405865-03, P = 2.688136 Days, E = 131.387861 Days

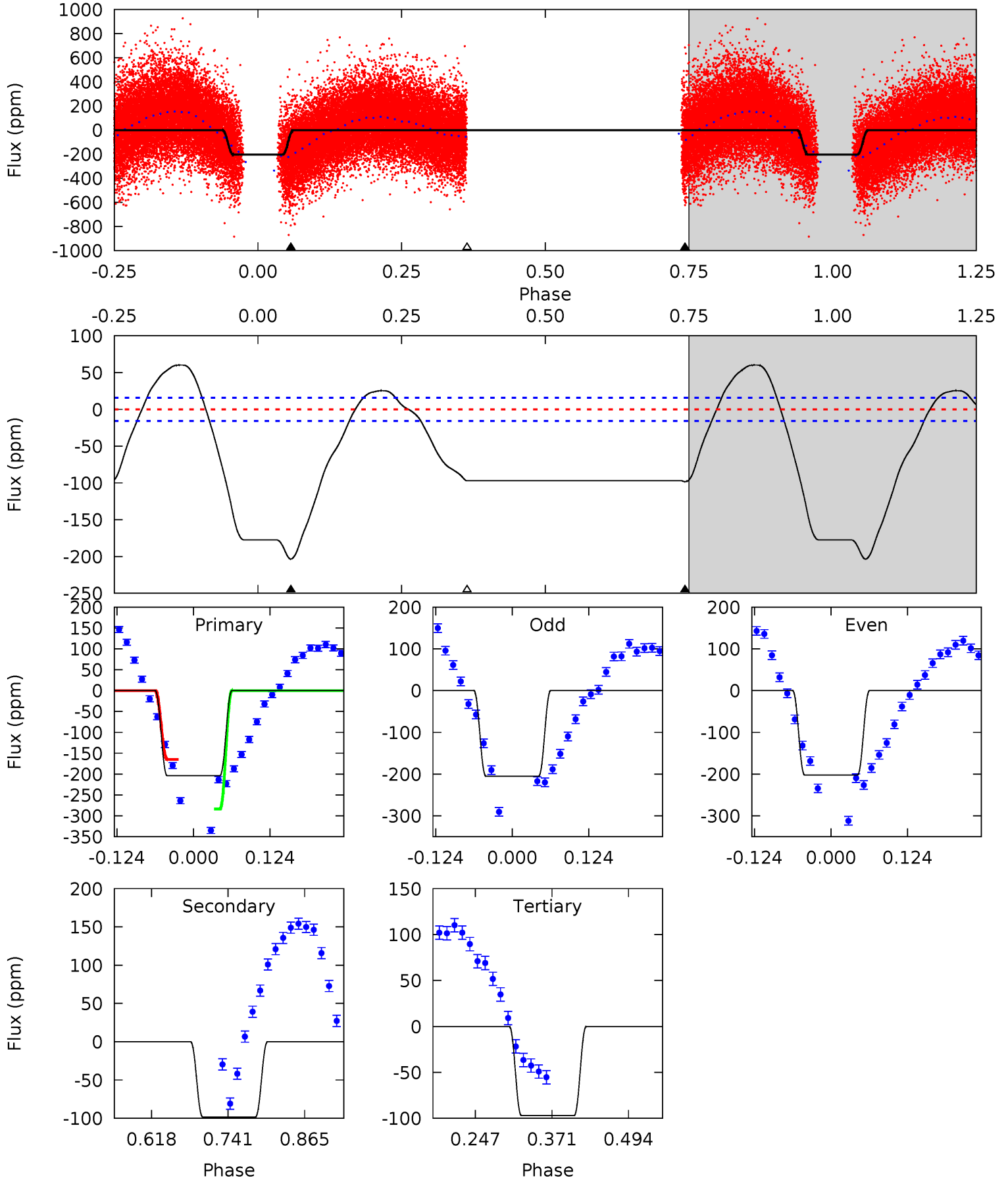
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.7	6.96	10.0	5.93	4.50	1.50	3.97	1.68	5.76	-3.05	1.03	0.90	1.18	0.34	0.40



Alt Model-Shift Uniqueness Test

009405865-03, P = 2.687961 Days, E = 131.431426 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
58.1	28.1	27.7	0	4.52	1.54	12.7	30.5	58.1	0.37	28.1	0.38	1.01	0.23	14.7



Stellar Parameters For KIC 009405865

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7193^{+200}_{-300}	$4.188^{+0.128}_{-0.192}$	$-0.200^{+0.250}_{-0.350}$	$1.580^{+0.501}_{-0.308}$	$1.409^{+0.218}_{-0.218}$	$0.503^{+0.323}_{-0.267}$
	+3%/-4%	+3%/-5%	+125%/-175%	+32%/-19%	+15%/-15%	+64%/-53%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009405865-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-21 ± 3	$1.18^{+0.28}_{-0.24}$	2718^{+220}_{-177}	5788^{+662}_{-477}	14^{+8}_{-5}
Alt.	-98 ± 4	$2.47^{+0.45}_{-0.35}$	2732^{+201}_{-183}	5947^{+311}_{-304}	16^{+5}_{-4}

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

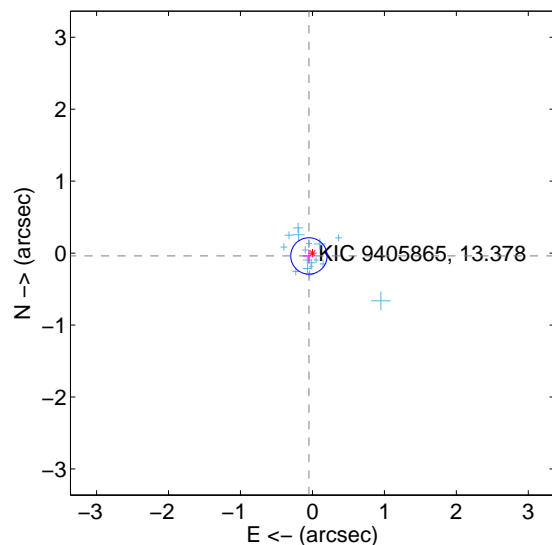
Supplemental centroid analysis for 009405865-03. Kepler magnitude: 13.38. Transit SNR 7.55

There are 17 quarters with good PRF difference image offsets

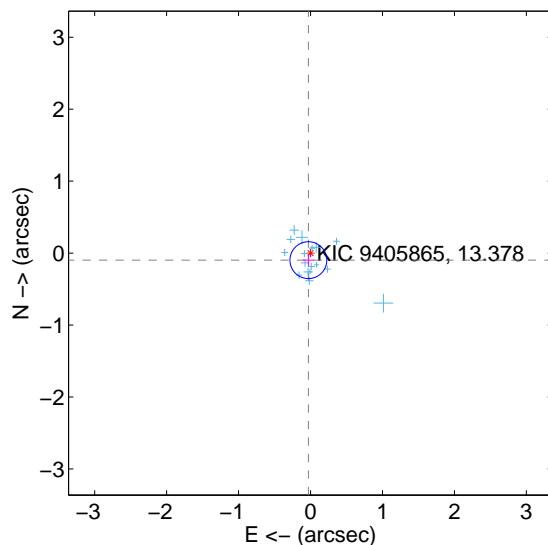
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.063 ± 0.084	0.74	0.049 ± 0.084	-0.039 ± 0.085
PRF-fit source offset from KIC position	0.103 ± 0.085	1.20	0.030 ± 0.082	-0.098 ± 0.086
photometric centroid source offset	0.76 ± 0.68	1.11	-0.12 ± 0.65	-0.75 ± 0.68

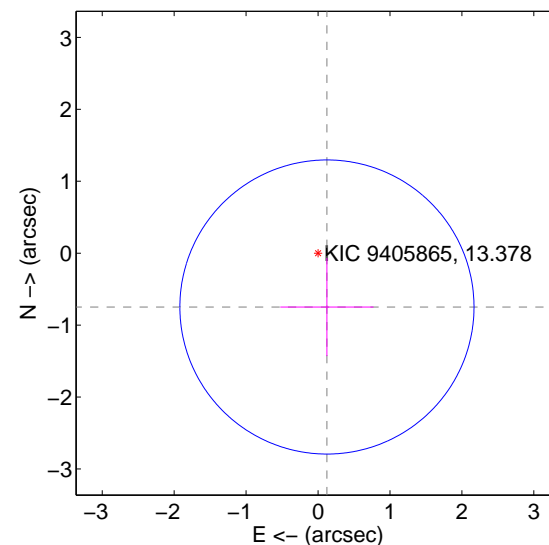
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

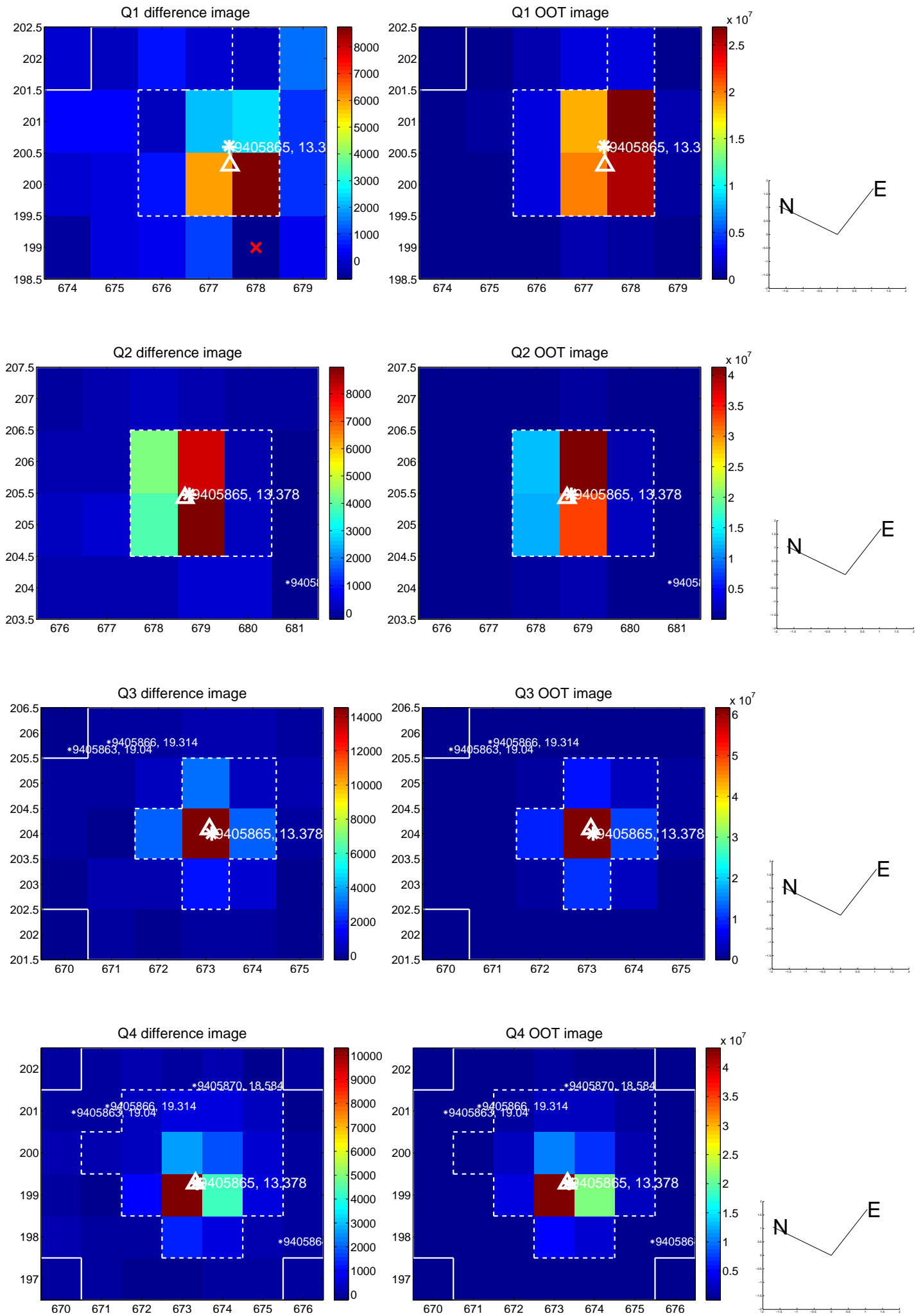


offset from photometric centroids

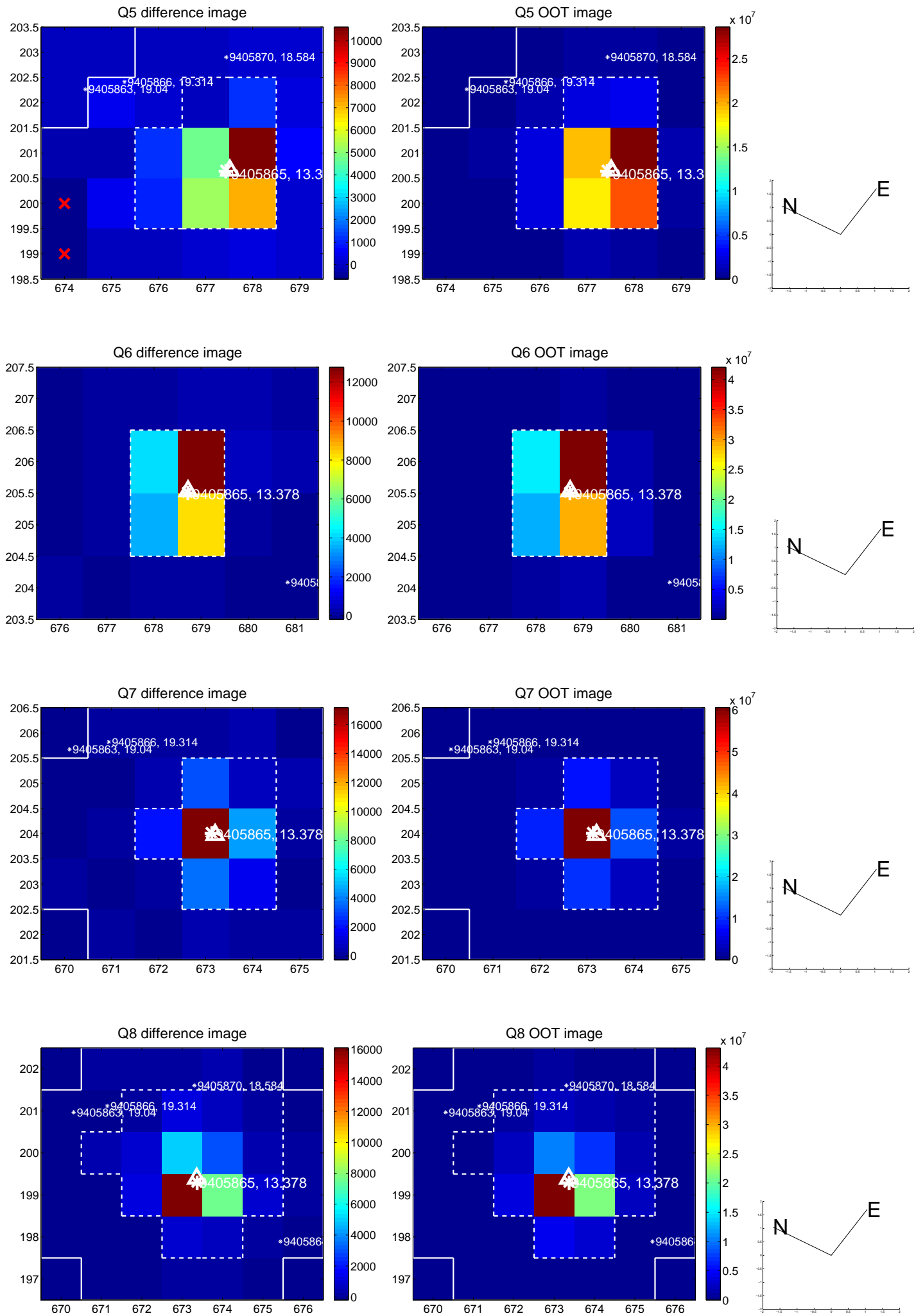


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

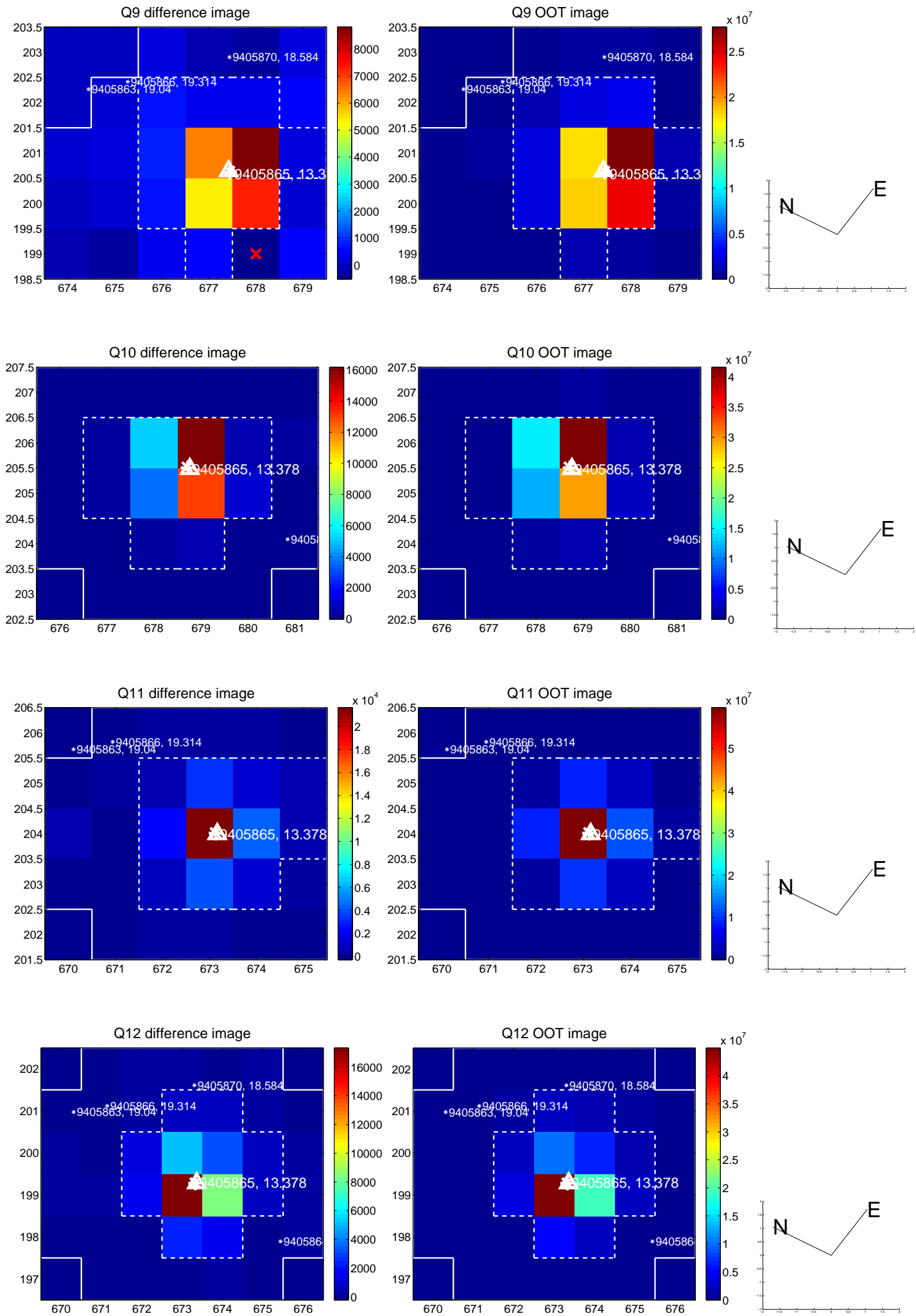
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



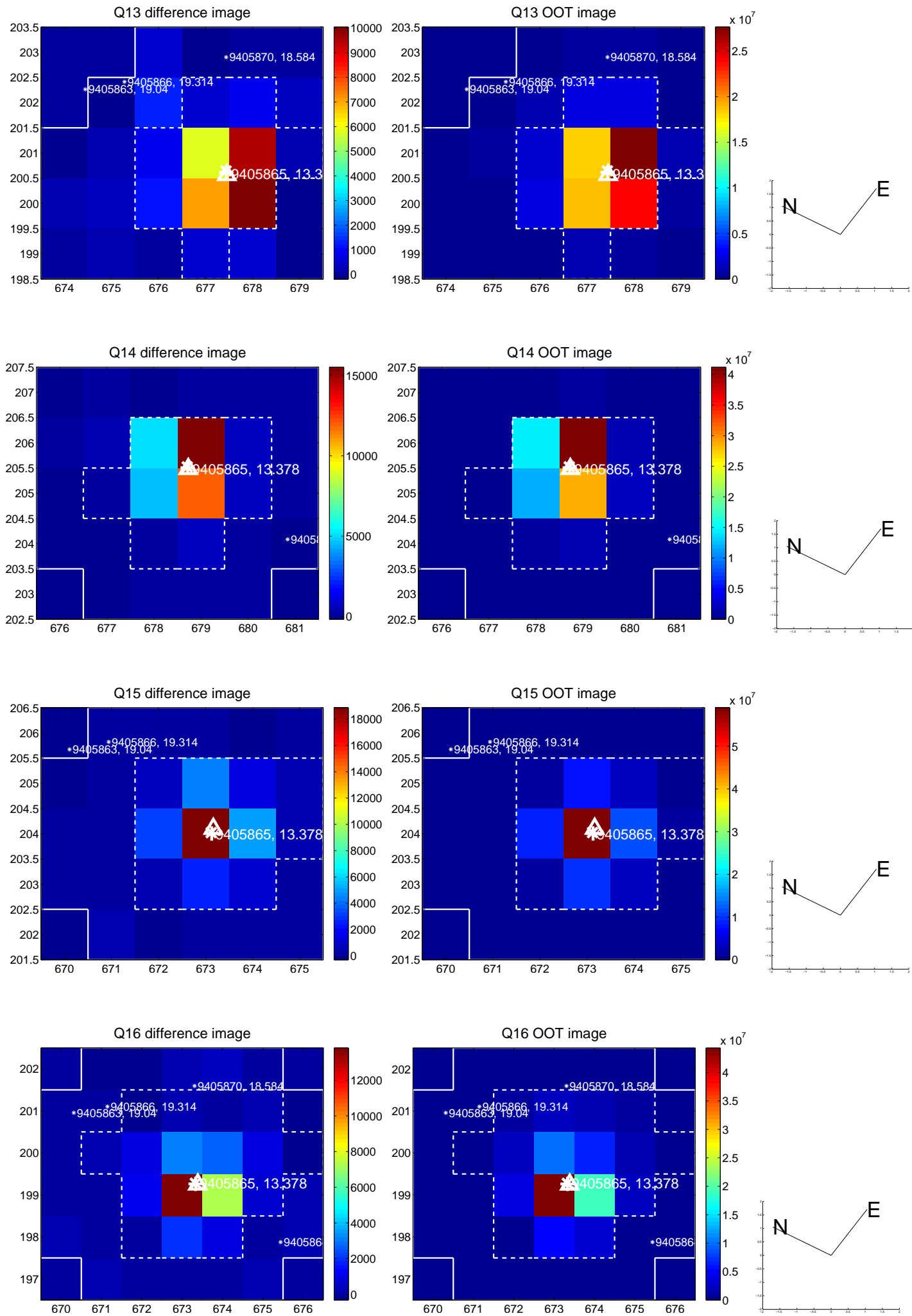
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



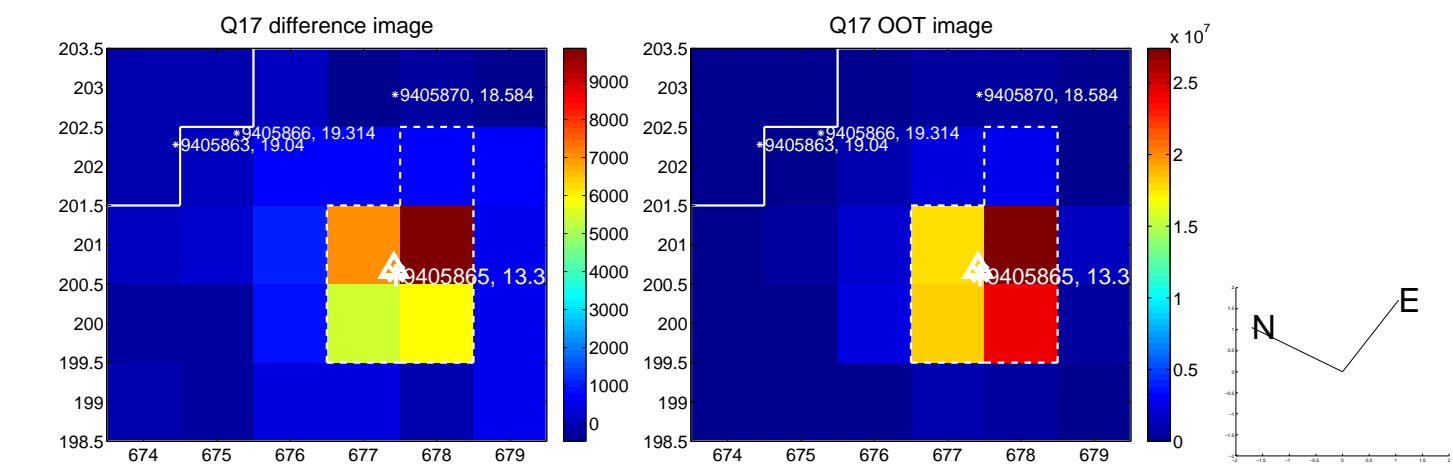
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



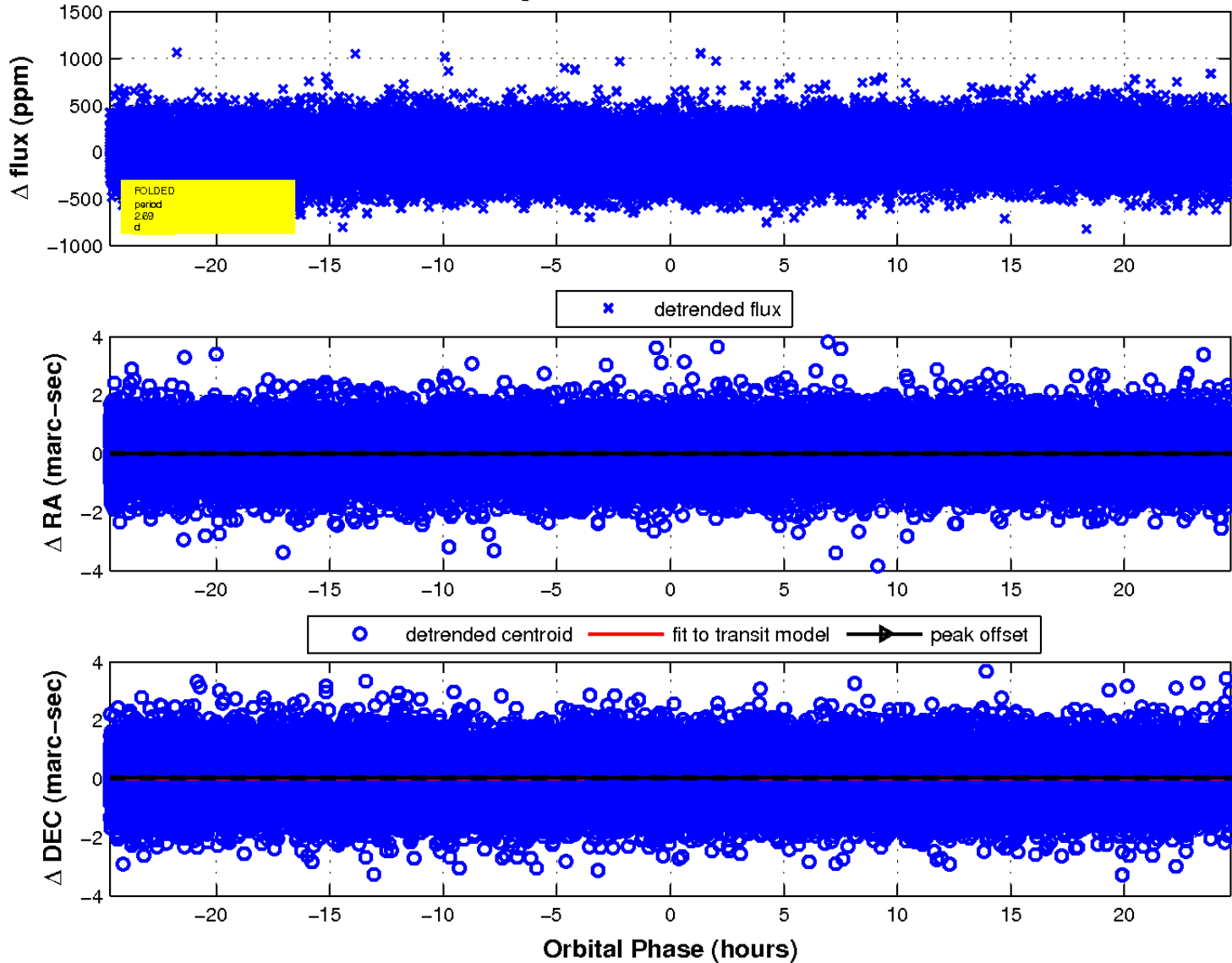
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

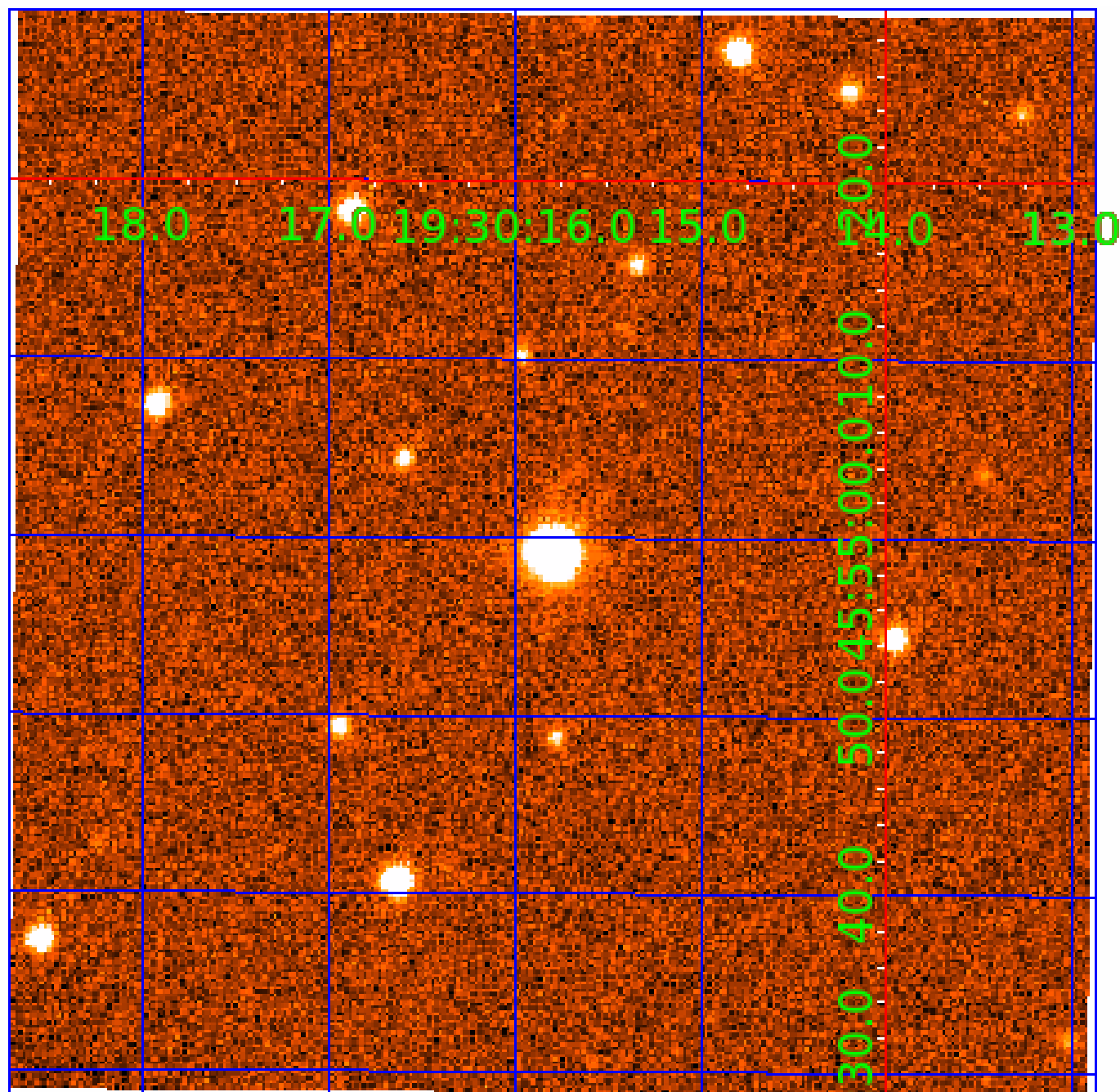


fluxWeightedCentroids, Planet 3 of 6



UKIRT Image

Declination



KIC 009405865

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})
009405865-01	OBS	No	2.687938	132.916423	32.9	7.937	11.2	8.9	1.58	7193	1.16	3334.88
009405865-02	OBS	No	2.688062	134.104001	33.6	1.293	11.5	5.6	1.58	7193	1.07	3334.68
009405865-03	OBS	No	2.688136	134.075997	40.7	8.228	12.8	7.5	1.58	7193	1.17	3334.55
009405865-04	OBS	No	2.687889	133.511935	49.4	9.086	12.4	14.2	1.58	7193	1.29	3334.96
009405865-05	OBS	No	61.502893	190.200197	187.7	6.572	8.2	7.1	1.58	7193	2.37	51.34
009405865-06	OBS	No	115.844151	210.325697	347.2	2.542	7.5	8.0	1.58	7193	3.38	22.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009405865-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009405865-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—HALO_GHOST
009405865-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD
009405865-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFFS
009405865-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_MEAS
009405865-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

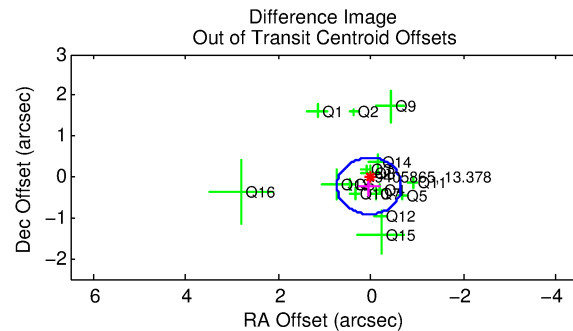
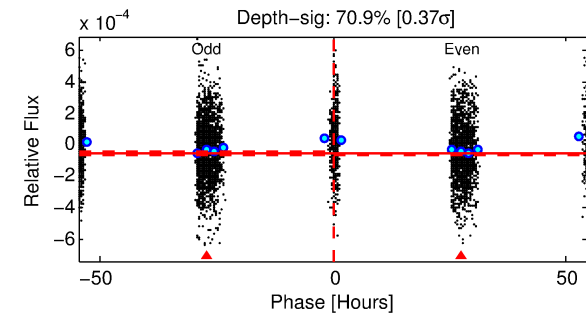
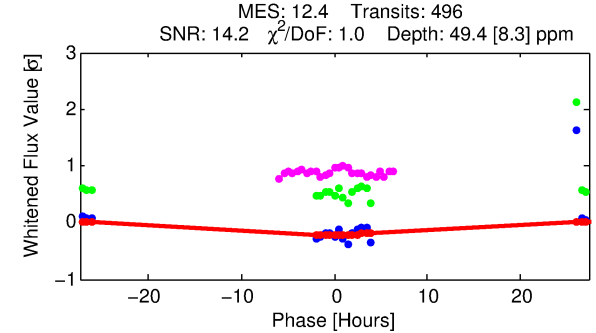
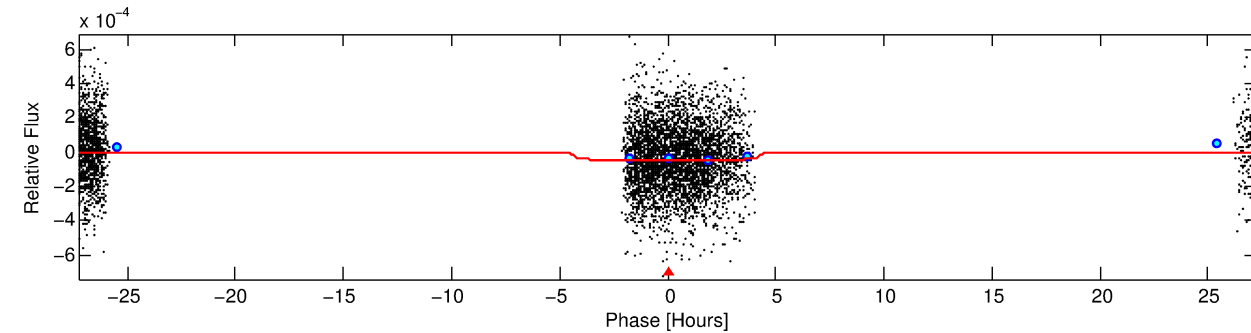
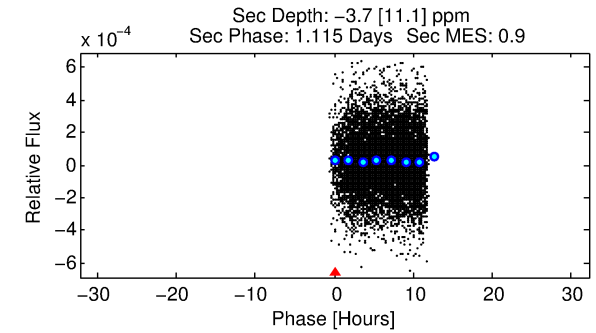
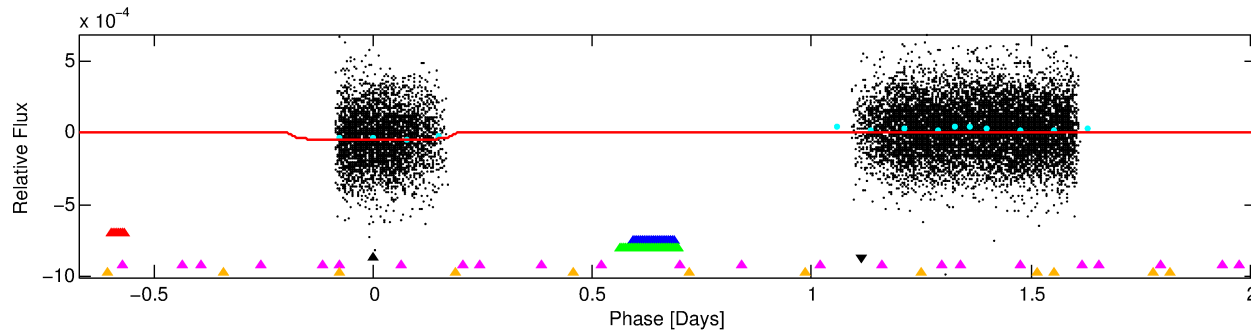
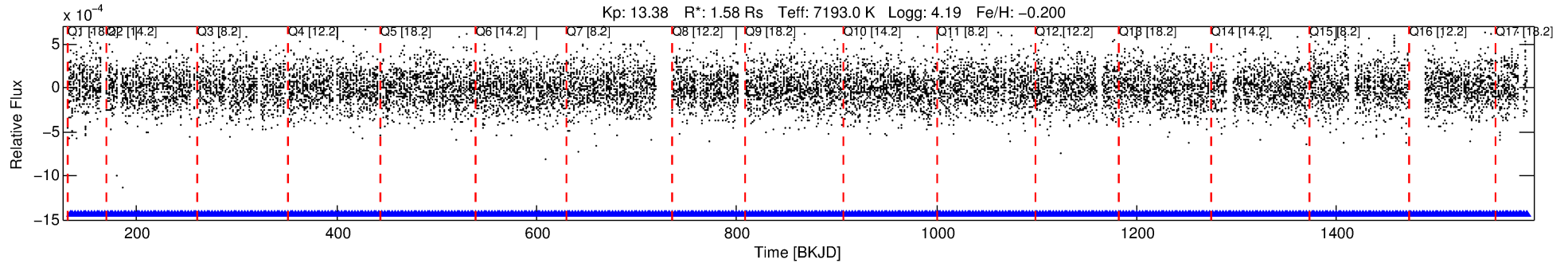
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009405865-04

No Significant Match Found

DV One-Page Summary

KIC: 9405865 Candidate: 4 of 6 Period: 2.688 d



DV Fit Results:

Period = 2.68789 [0.00053] d
Epoch = 133.5119 [0.1668] BKJD
Rp/R* = 0.0075 [0.0136]
a/R* = 1.39 [7.78]
b = 0.90 [2.45]
Seff = 3334.96 [1331.42]
Teq = 1938 [193] K
Rp = 1.29 [2.38] Re
a = 0.0424 [0.0109] AU
Ag = N/A
Teffp = N/A

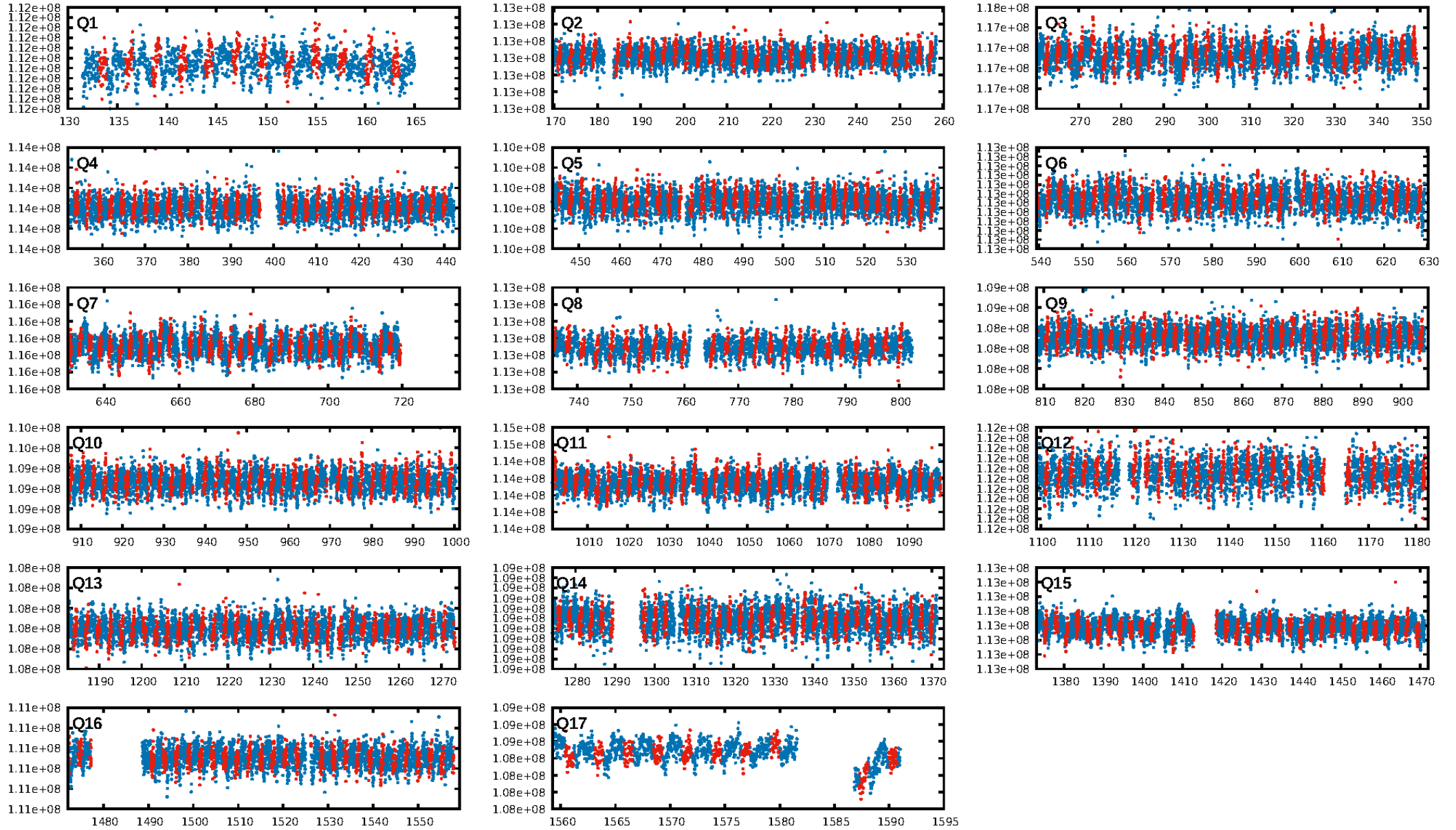
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.99e-34
RollingBand-fgt: 1.00 [474/474]
GhostDiagnostic-chr: 11.31
Centroid-sig: 24.2%
Centroid-so: 0.515 arcsec [1.10σ]
OotOffset-rm: 0.226 arcsec [0.98σ]
KicOffset-rm: 0.286 arcsec [1.32σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.06 [1/16]
DiffImageOverlap-fno: 0.00 [0/17]

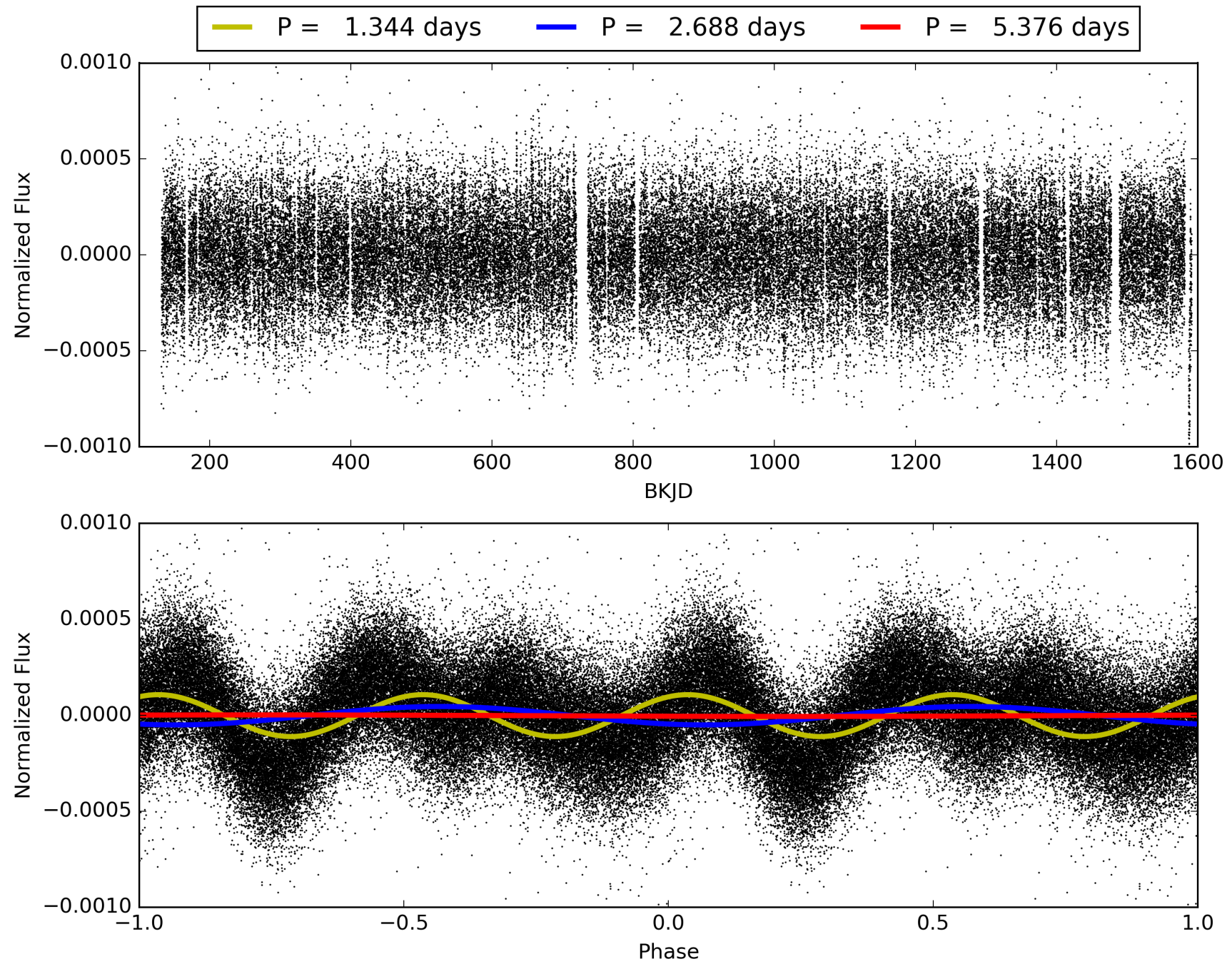
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 16:28:52 Z

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

TCE 009405865-04, PDC Light Curves

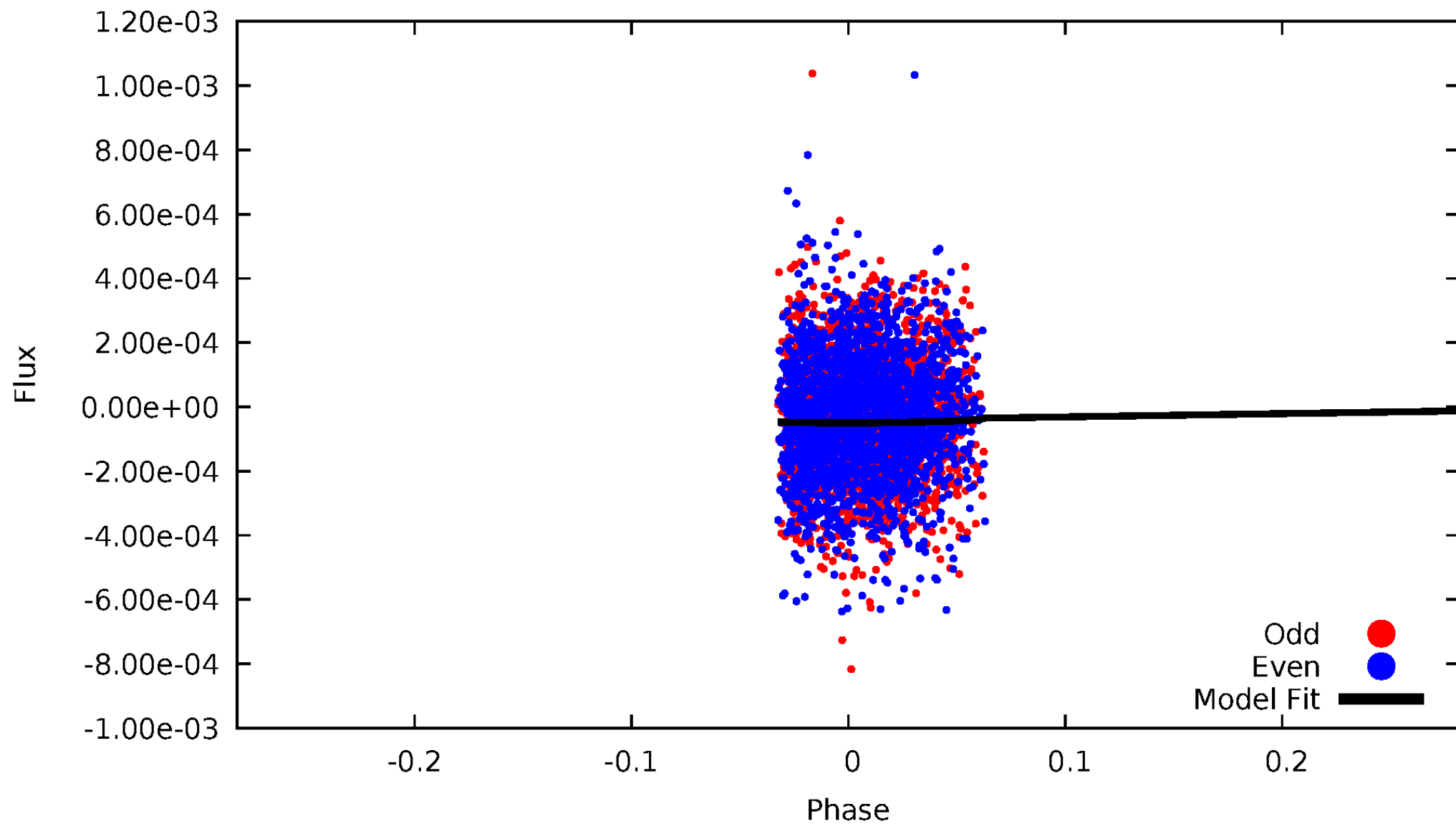


TCE 009405865-04



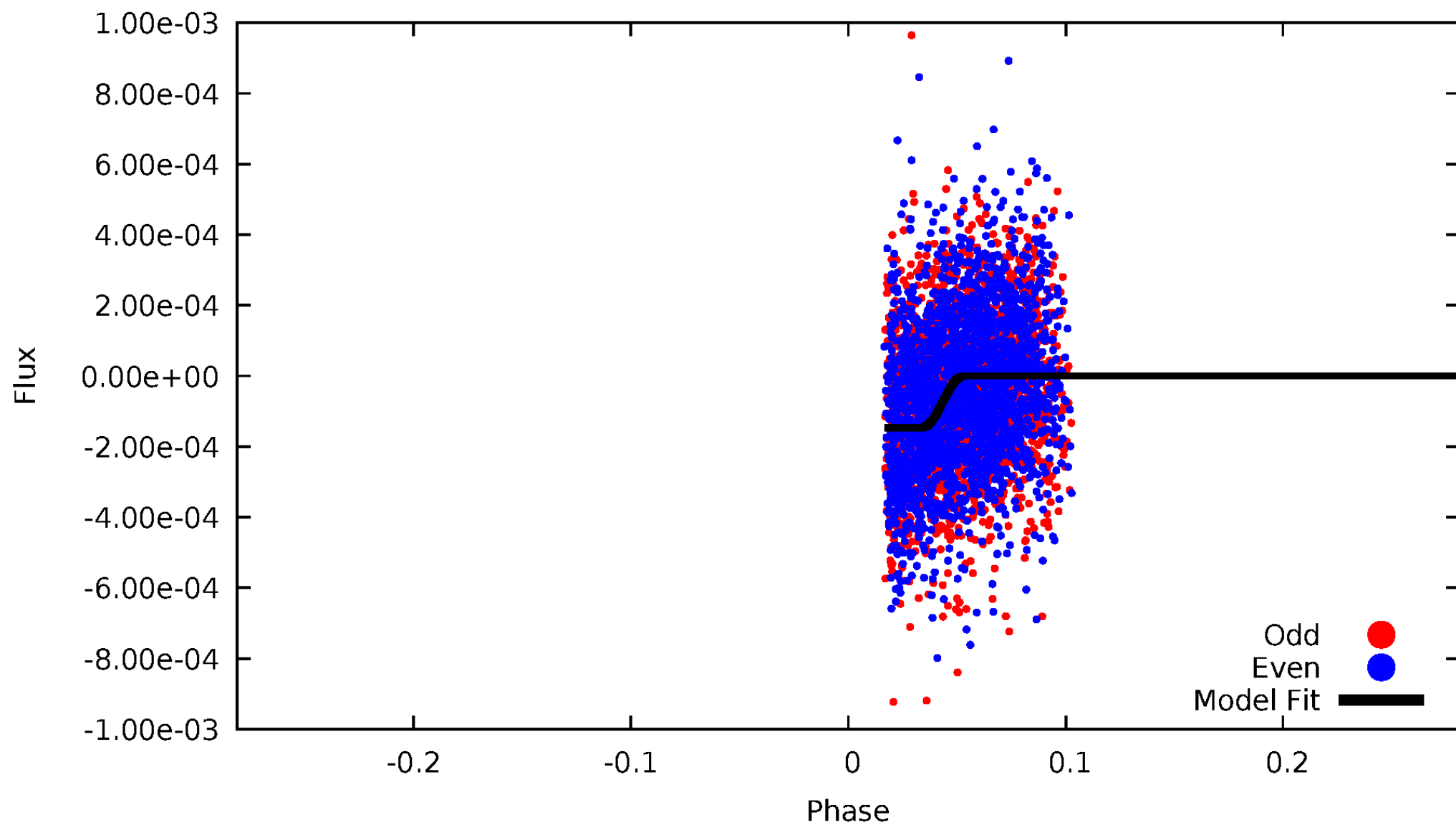
DV Odd/Even

TCE 009405865-04



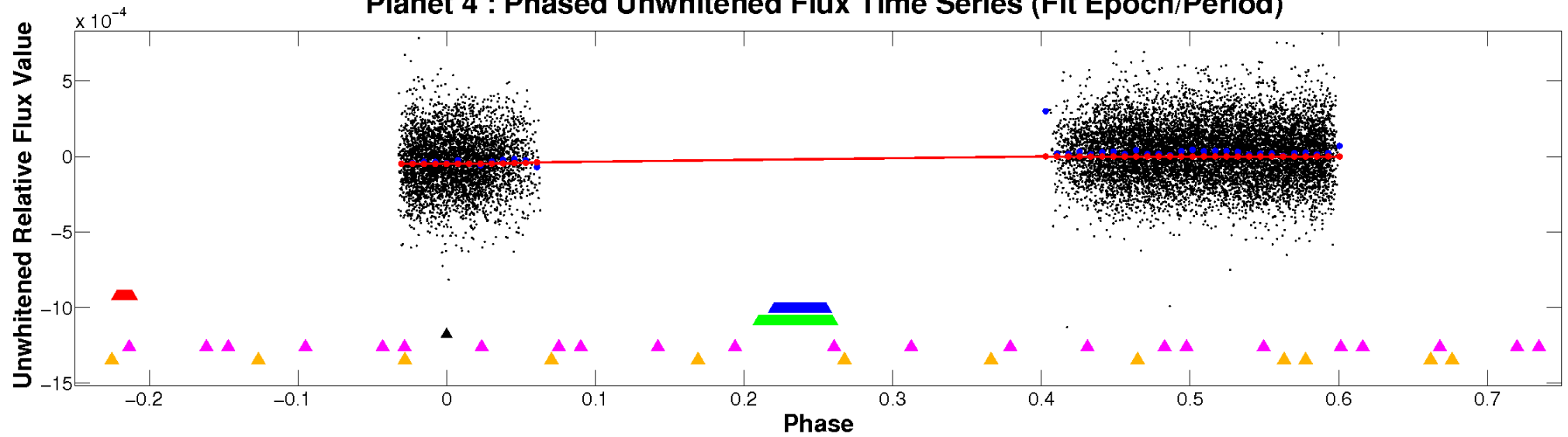
ALT Odd/Even

TCE 009405865-04

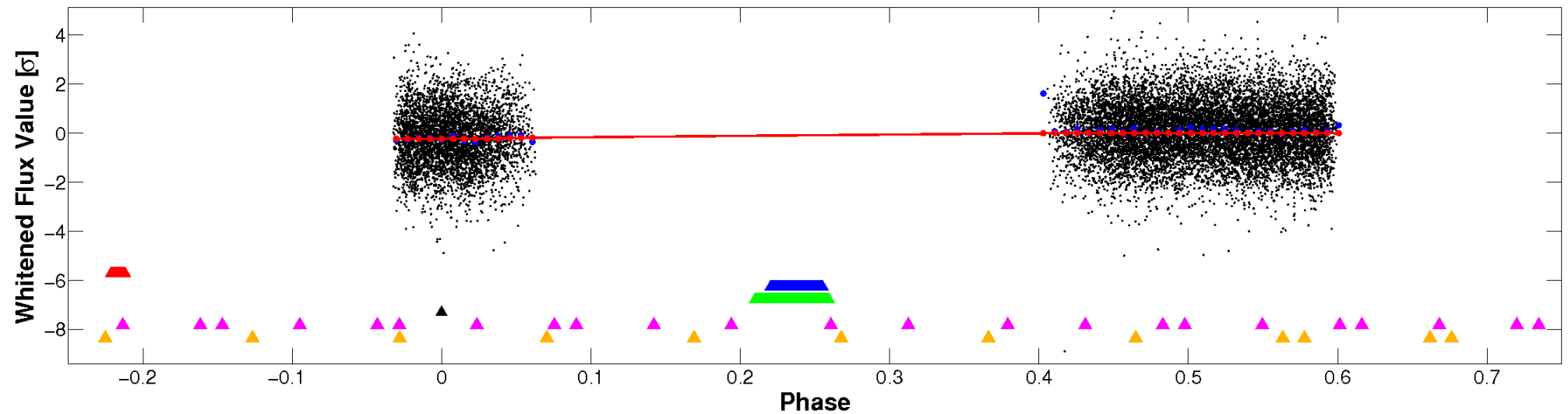


Non-Whitened Vs. Whitened Light Curve

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

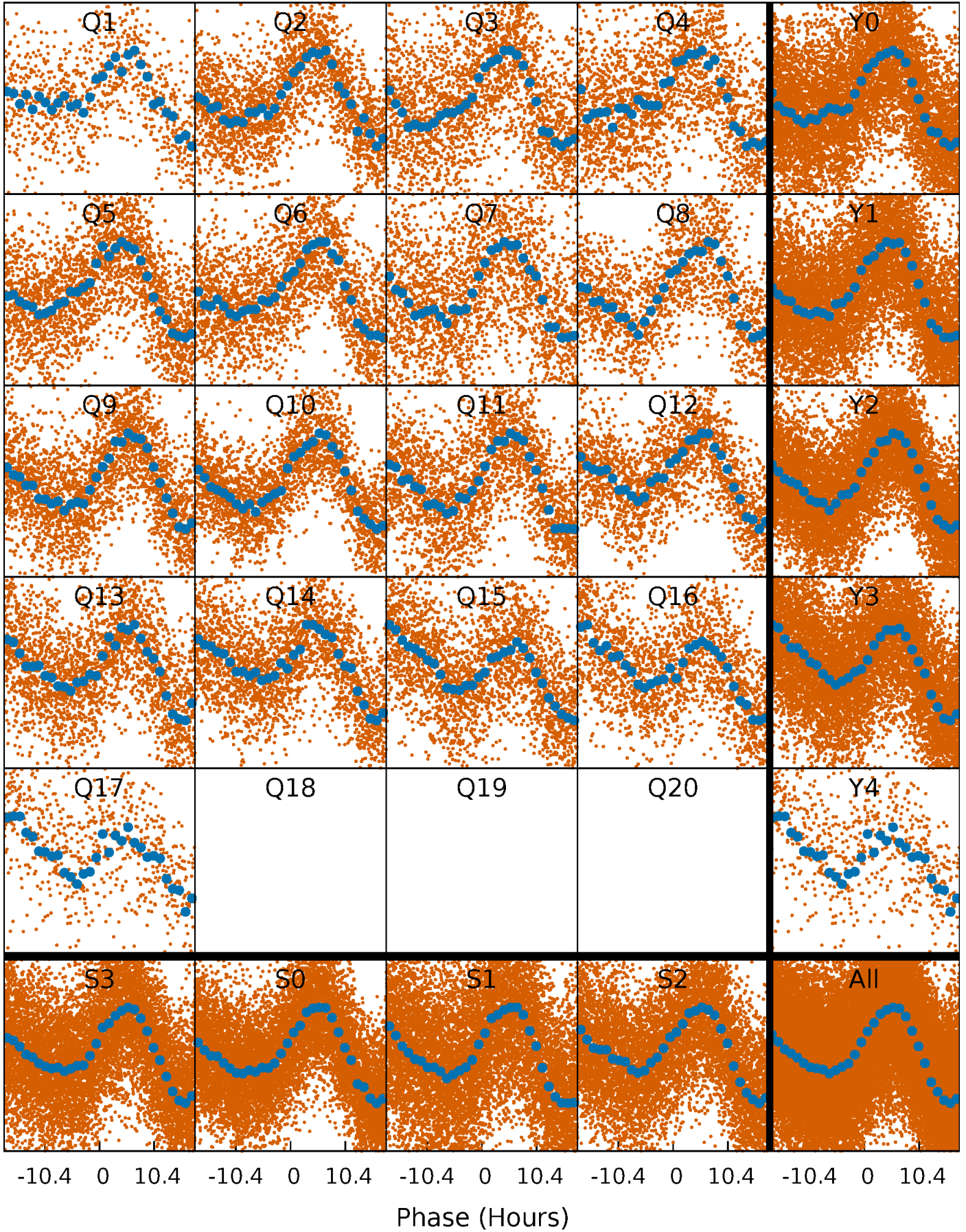


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



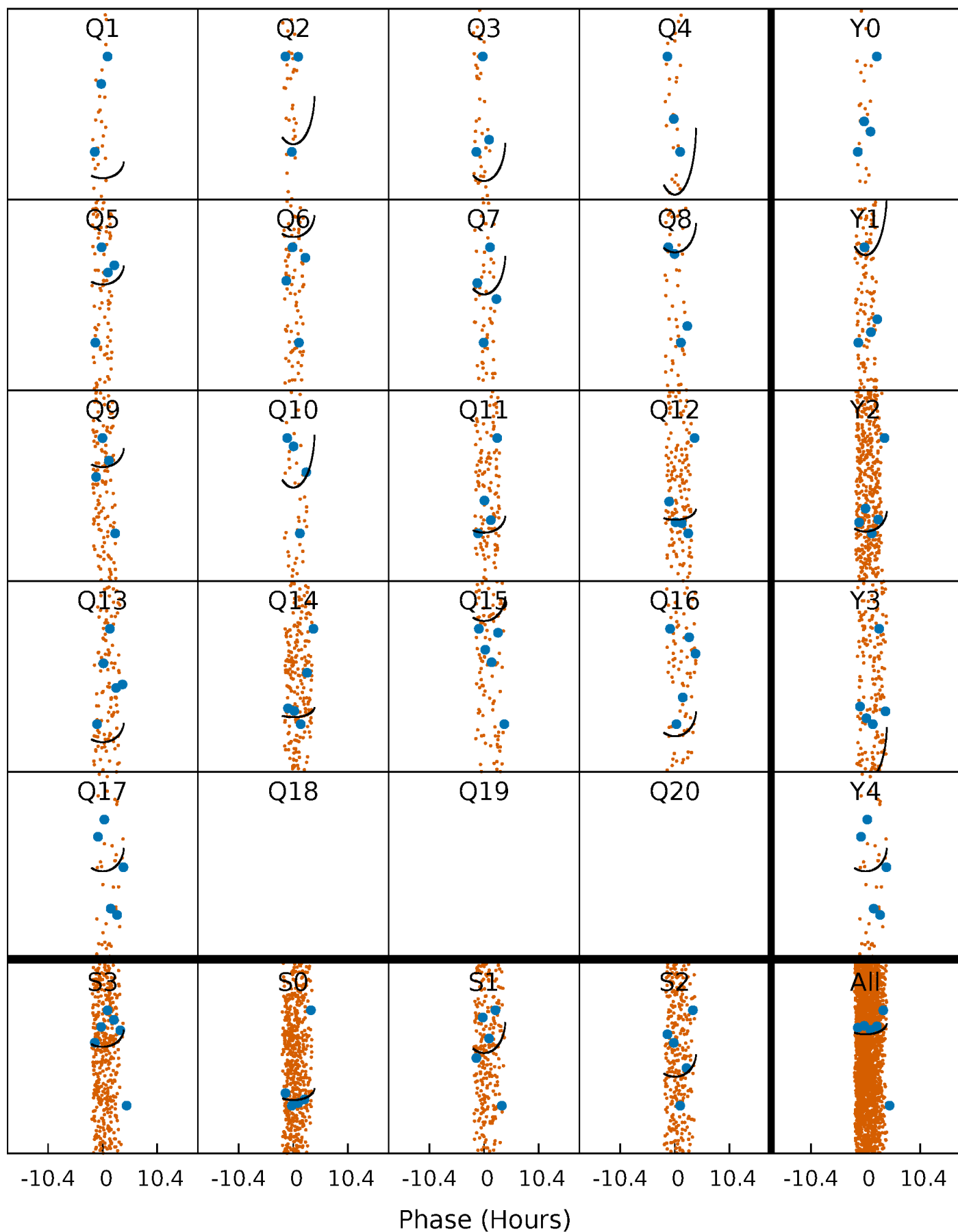
PDC Quarter-Phased Transit Curves

TCE 009405865-04 P= 2.687889 Days $T_0=133.511935$ (BKJD)



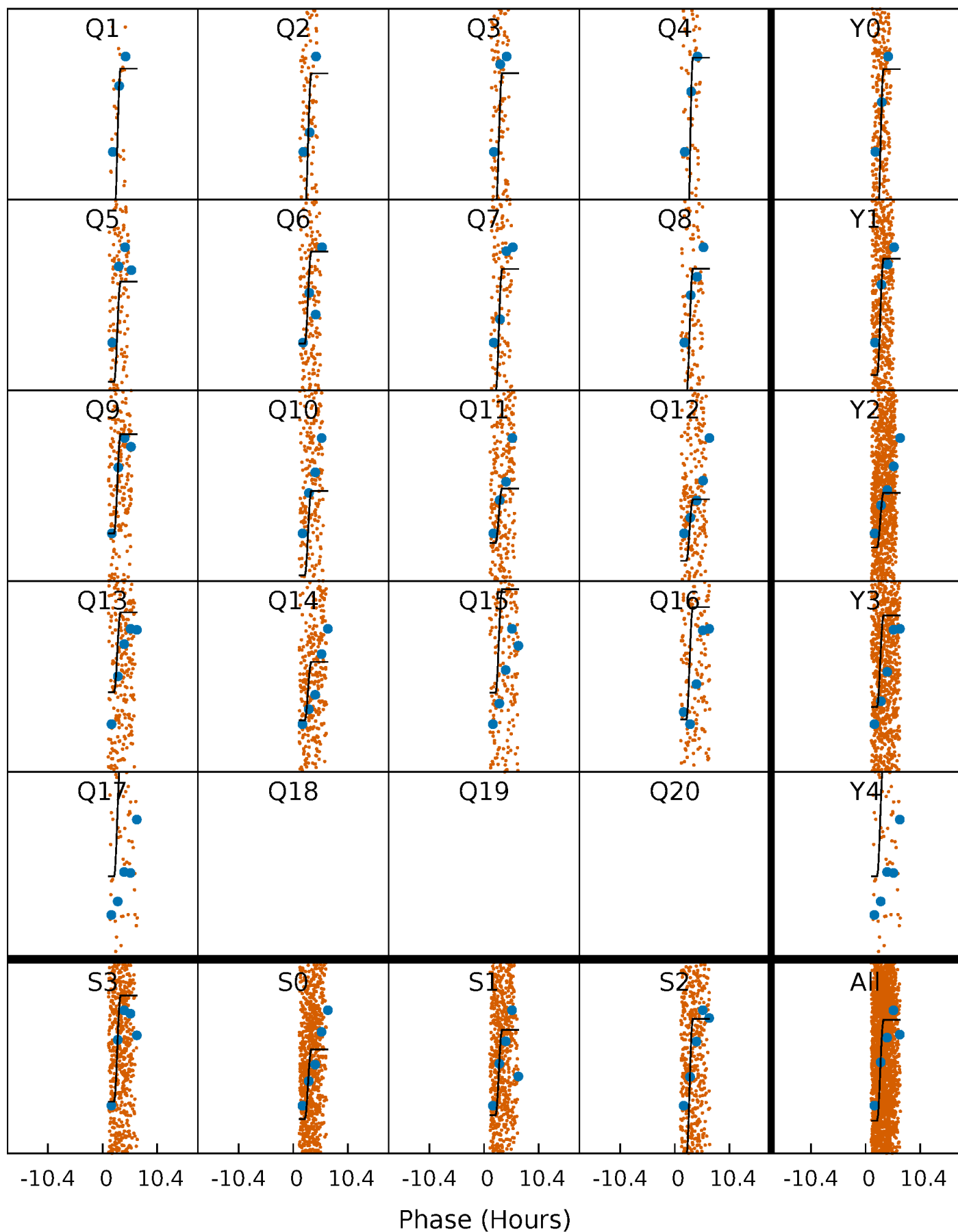
DV Quarter-Phased Transit Curves

TCE 009405865-04 $P = 2.687889$ Days $T_0 = 133.511935$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

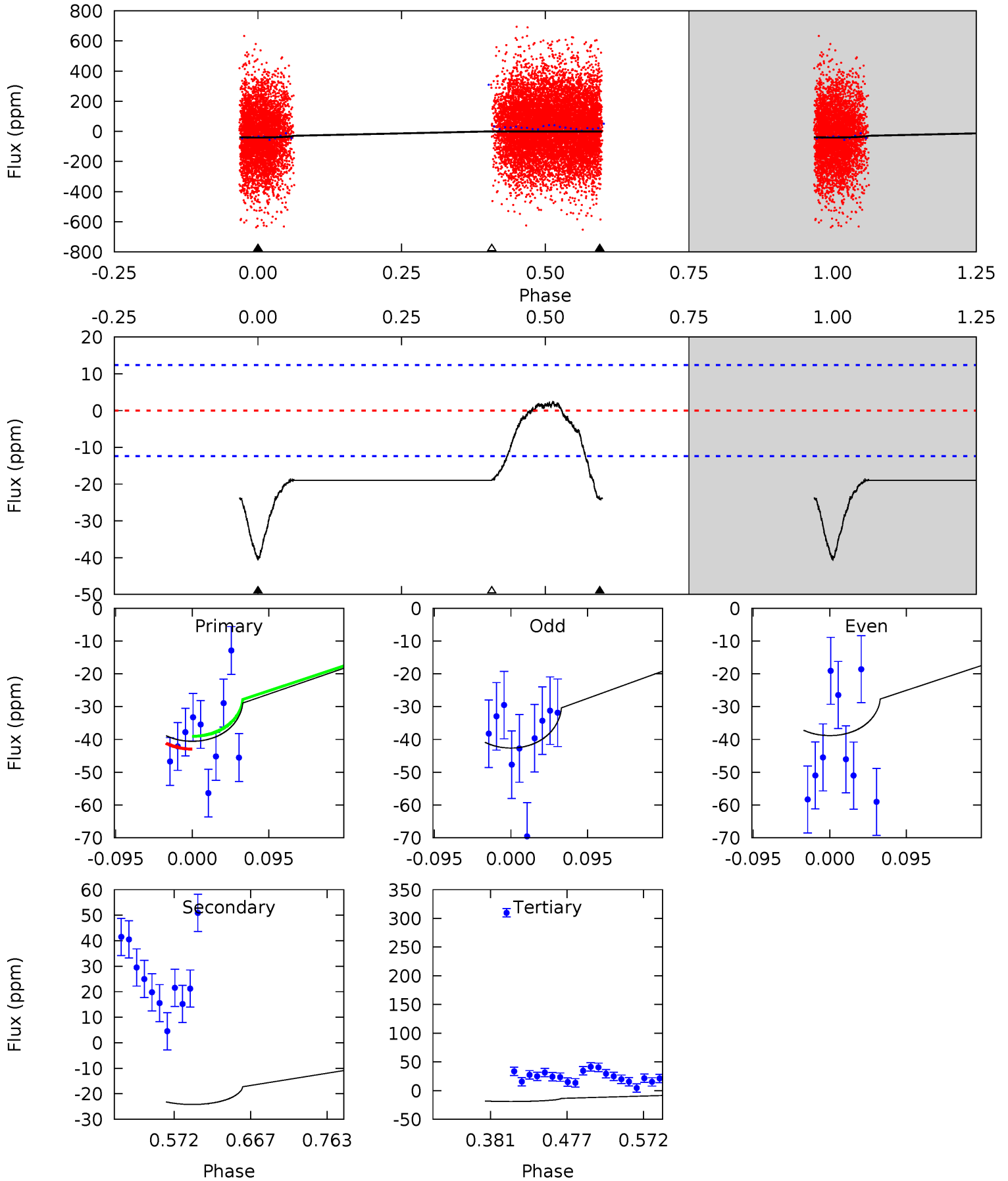
TCE 009405865-04 P= 2.687957 Days $T_0=133.368447$ (BKJD)



DV Model-Shift Uniqueness Test

009405865-04, P = 2.687889 Days, E = 130.824046 Days

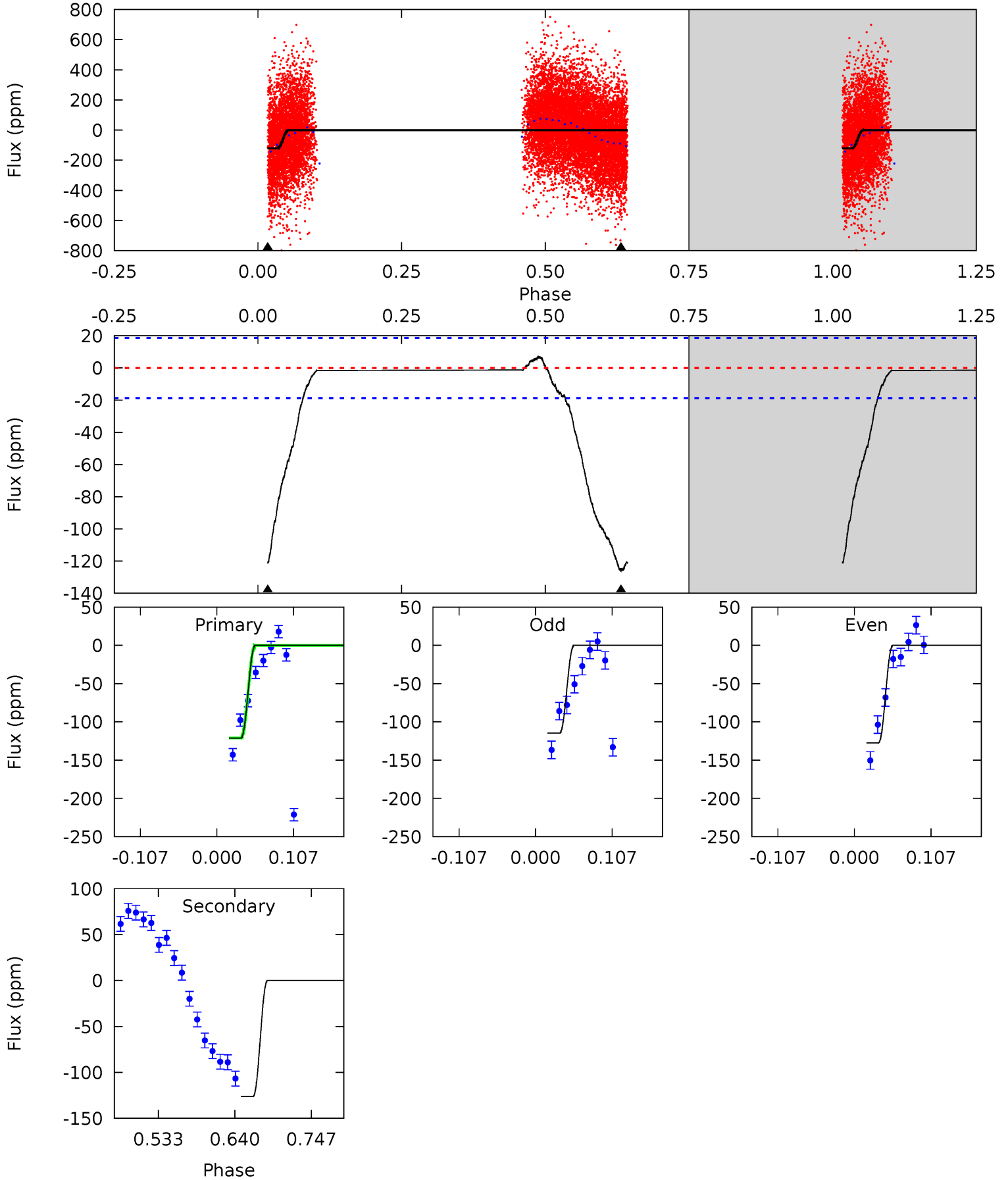
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.0	8.95	7.02	0	4.57	1.67	1.93	7.99	15.0	1.93	8.95	0.71	0.94	0.06	0.72



Alt Model-Shift Uniqueness Test

009405865-04, P = 2.687957 Days, E = 130.680490 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
29.5	30.8	0	0	4.55	1.61	1.83	29.5	29.5	30.8	30.8	1.54	0.96	0.06	0



Stellar Parameters For KIC 009405865

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7193^{+200}_{-300}	$4.188^{+0.128}_{-0.192}$	$-0.200^{+0.250}_{-0.350}$	$1.580^{+0.501}_{-0.308}$	$1.409^{+0.218}_{-0.218}$	$0.503^{+0.323}_{-0.267}$
	+3%/-4%	+3%/-5%	+125%/-175%	+32%/-19%	+15%/-15%	+64%/-53%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009405865-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-24 ± 3	$2.15^{+2.28}_{-1.44}$	2710^{+218}_{-171}	4560^{+3609}_{-1142}	$5.130^{+43.057}_{-3.946}$
Alt.	-126 ± 4	$2.68^{+2.19}_{-1.66}$	2717^{+227}_{-161}	6068^{+4955}_{-1409}	17^{+103}_{-12}

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

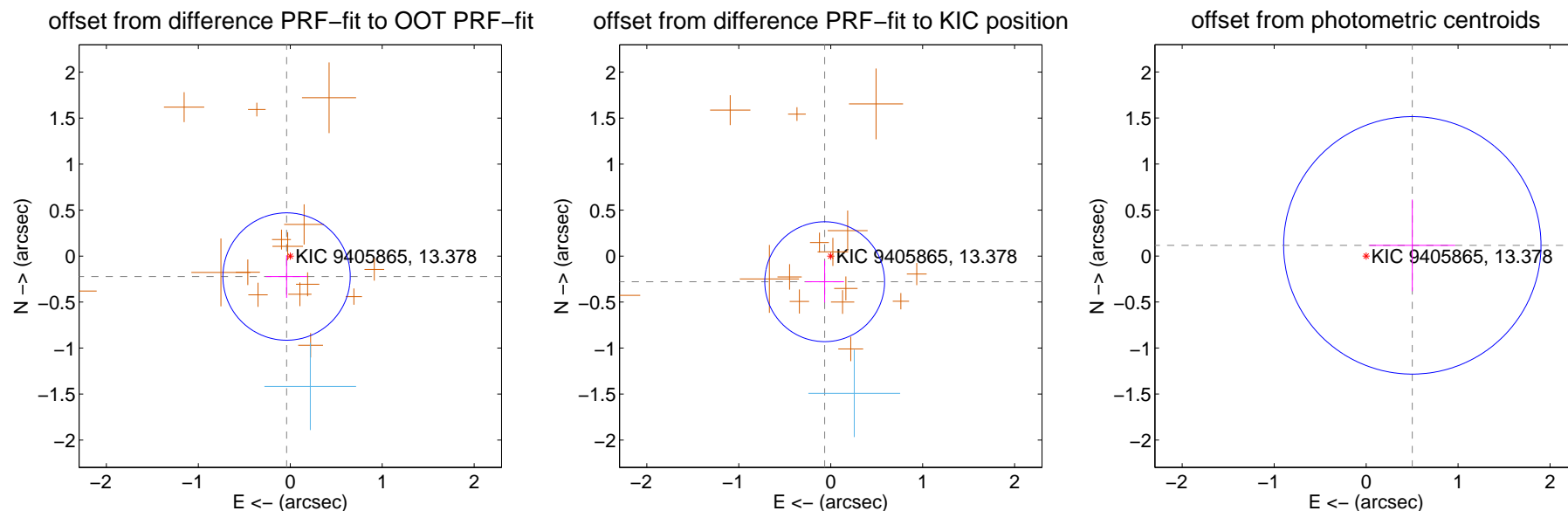
DV Centroid Data

Supplemental centroid analysis for 009405865-04. Kepler magnitude: 13.38. Transit SNR 14.16

There are 1 quarters with good PRF difference image offsets

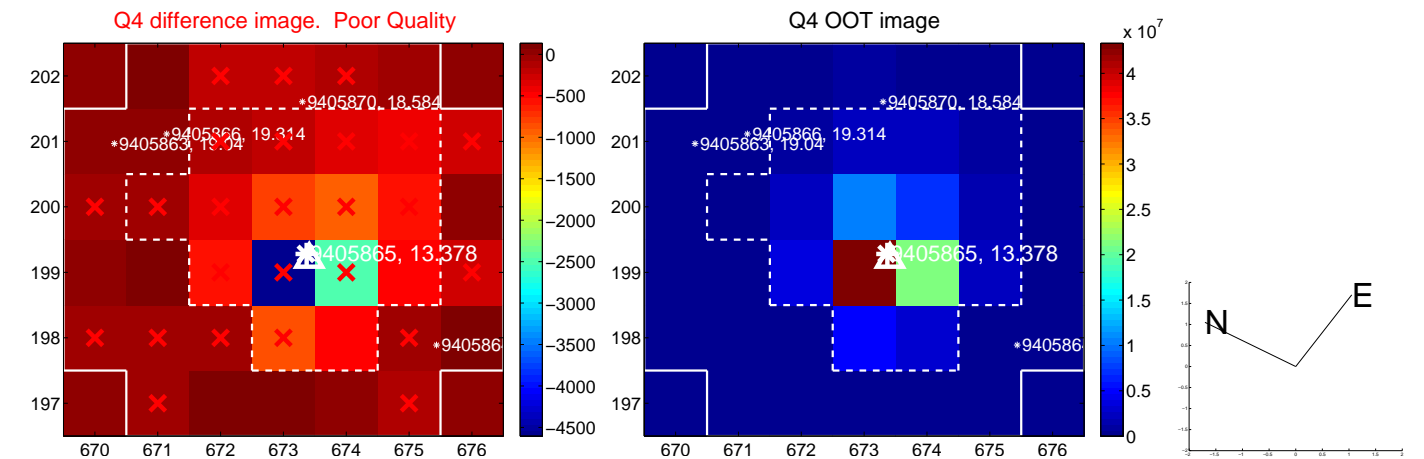
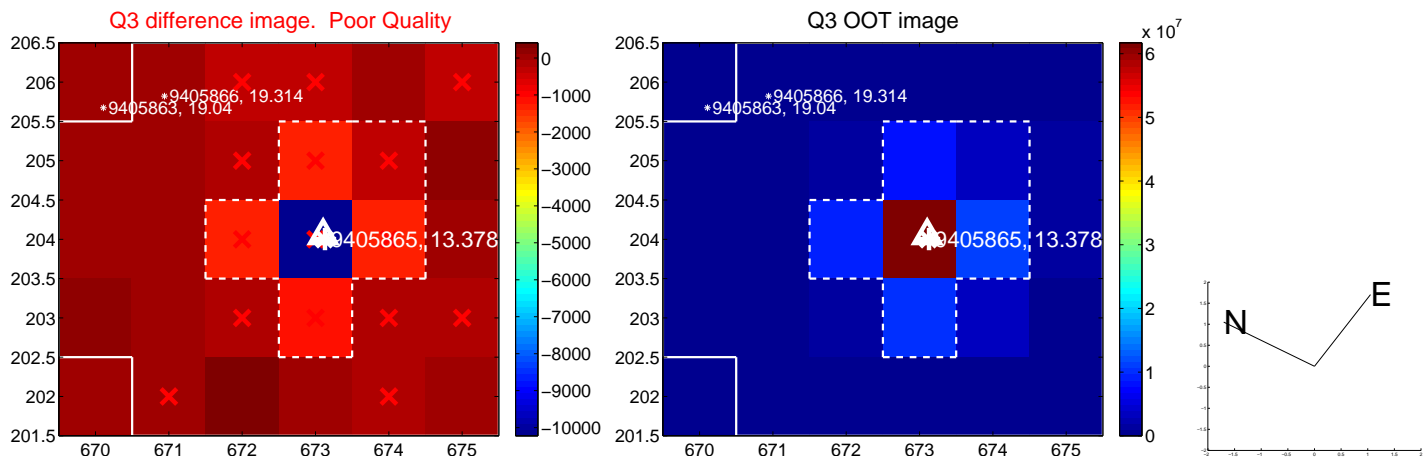
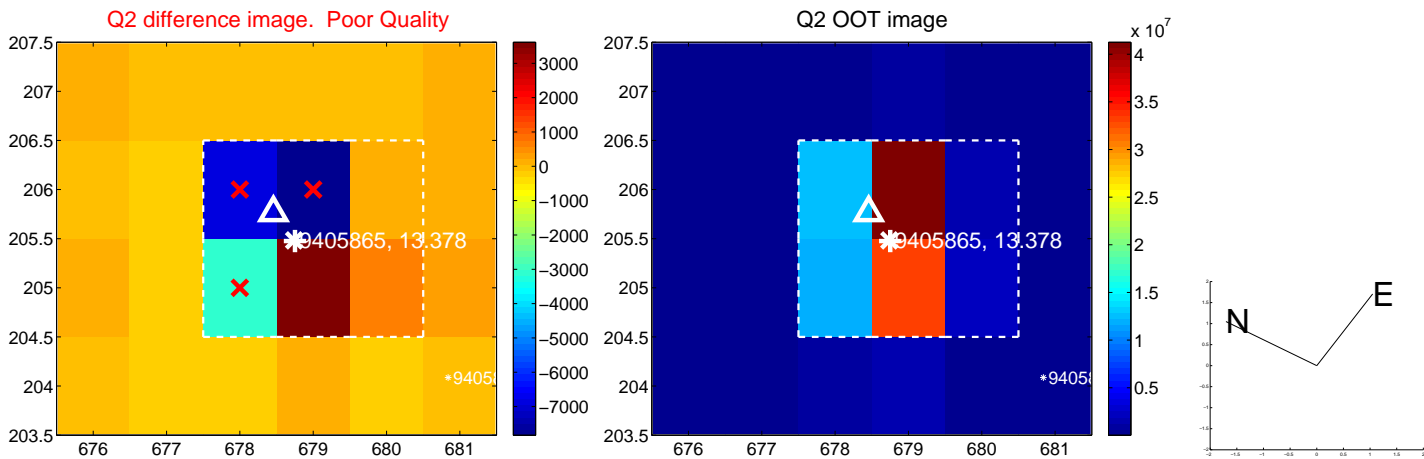
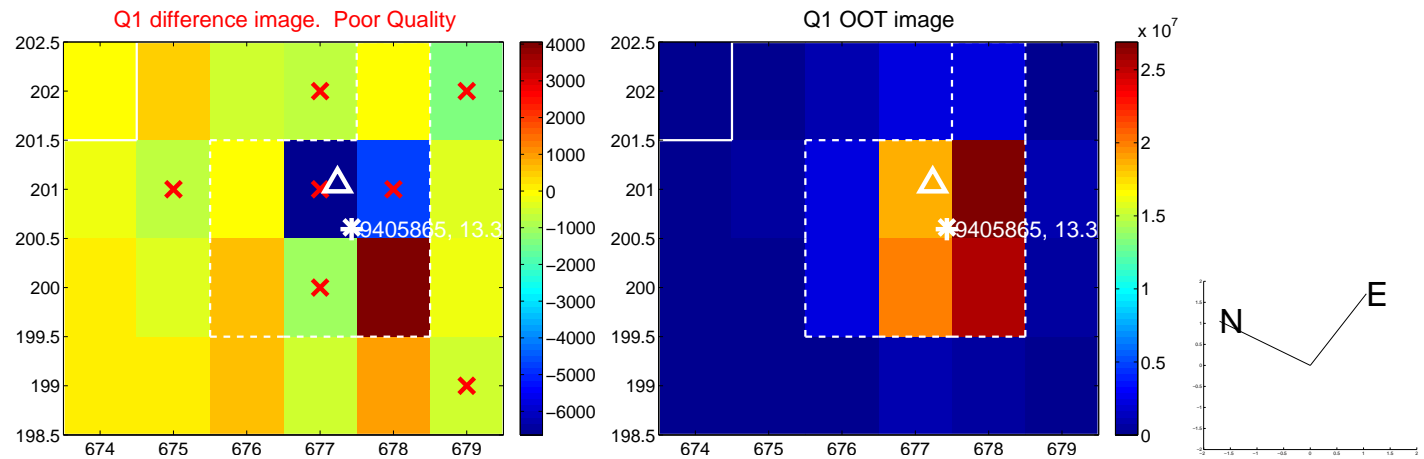
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.226 ± 0.231	0.98	0.040 ± 0.225	-0.222 ± 0.231
PRF-fit source offset from KIC position	0.286 ± 0.217	1.32	0.066 ± 0.210	-0.278 ± 0.227
photometric centroid source offset	0.52 ± 0.47	1.10	-0.50 ± 0.46	0.12 ± 0.50

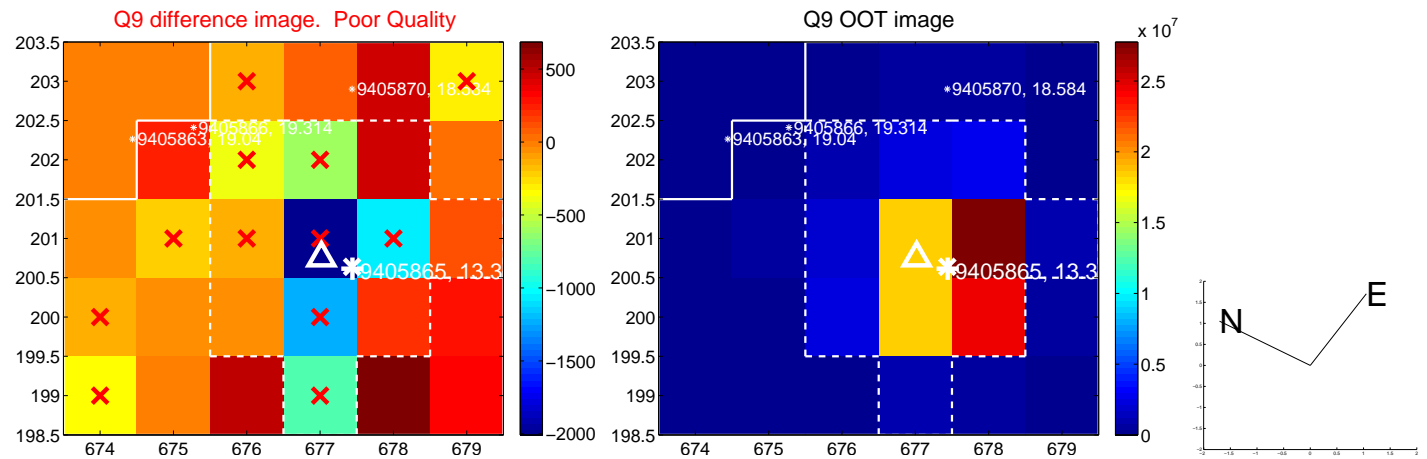


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

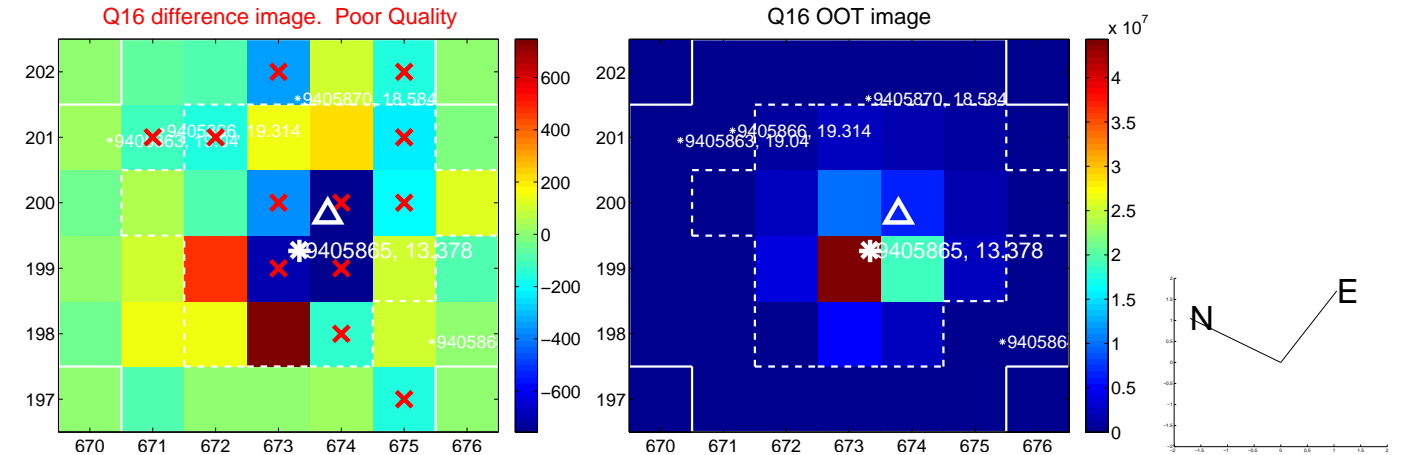
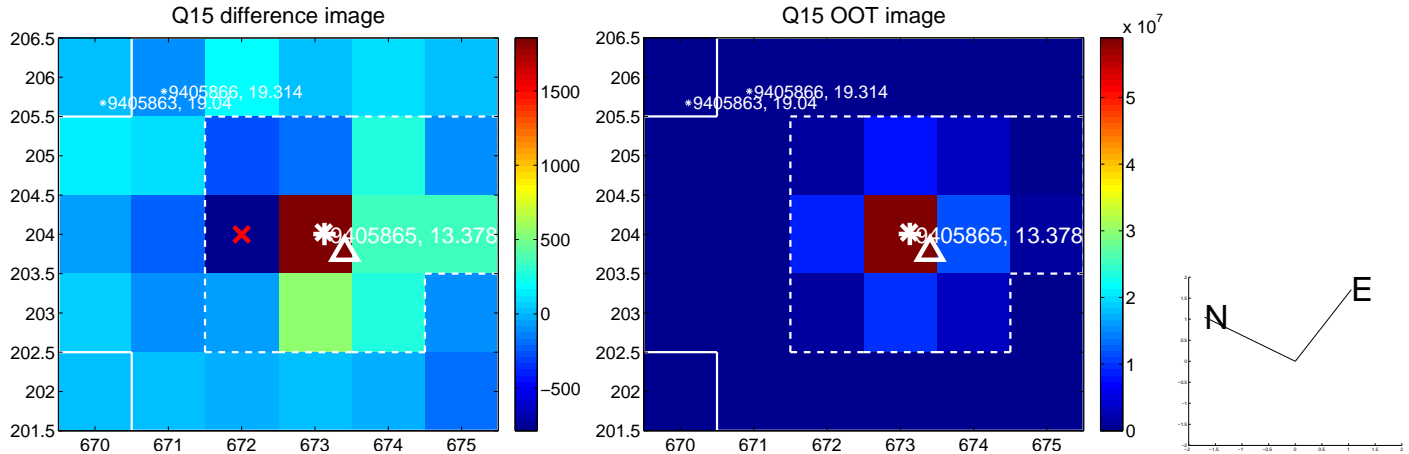
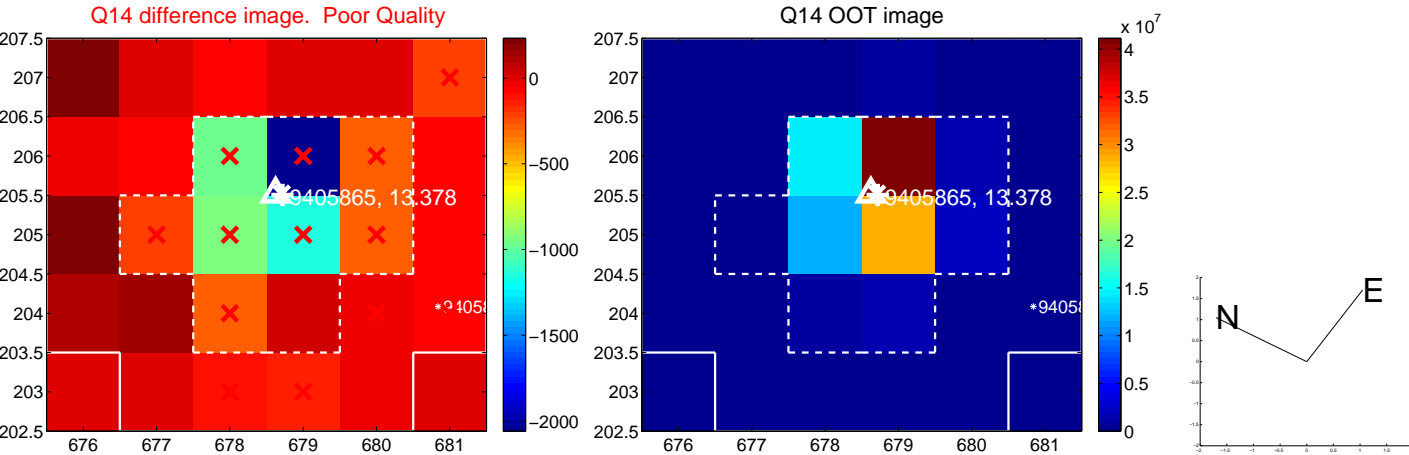
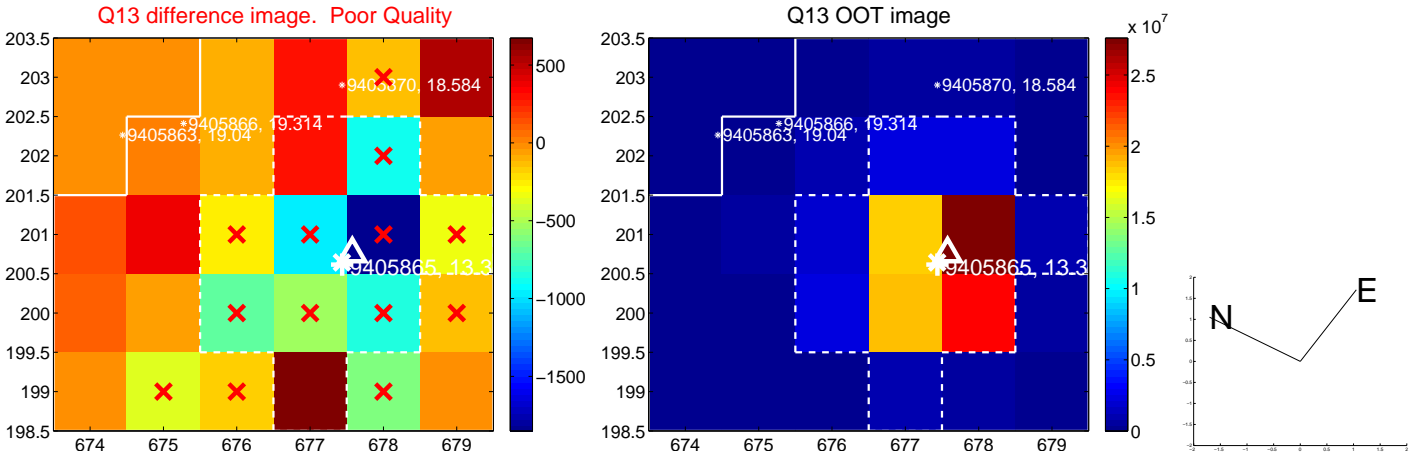
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



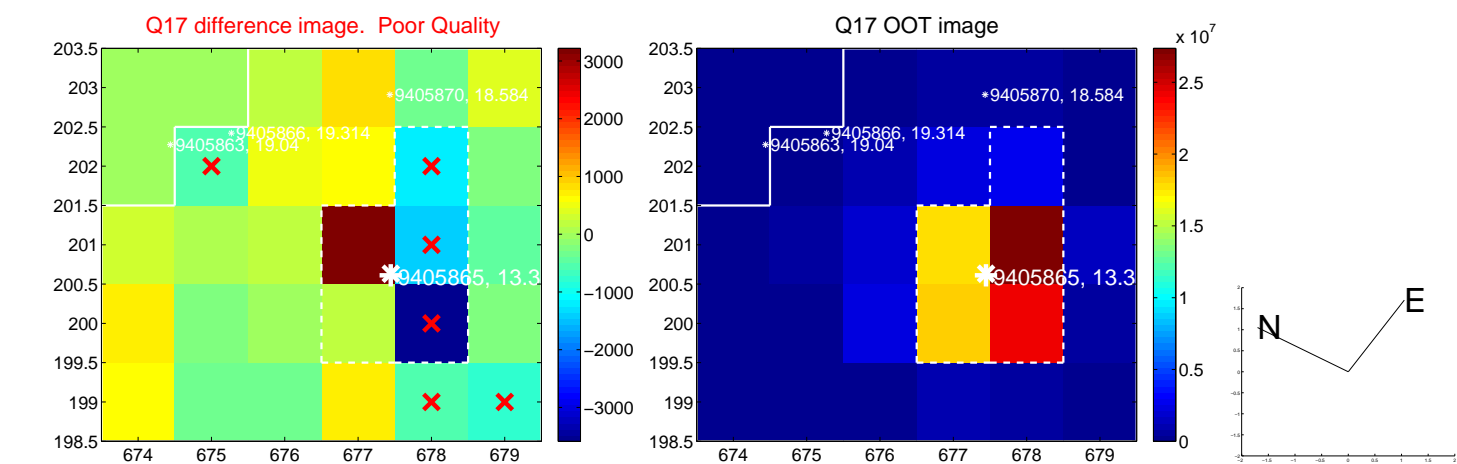
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



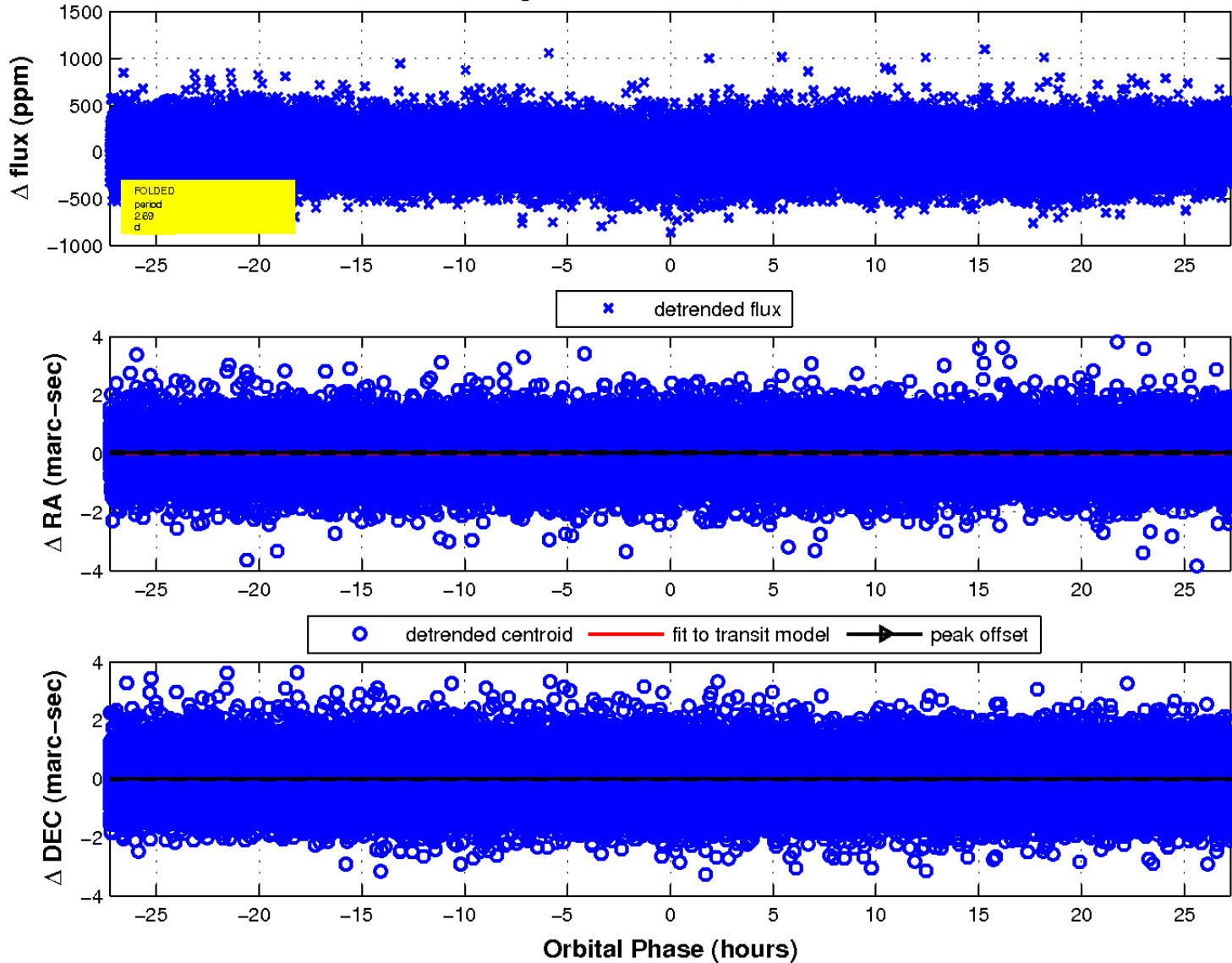
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

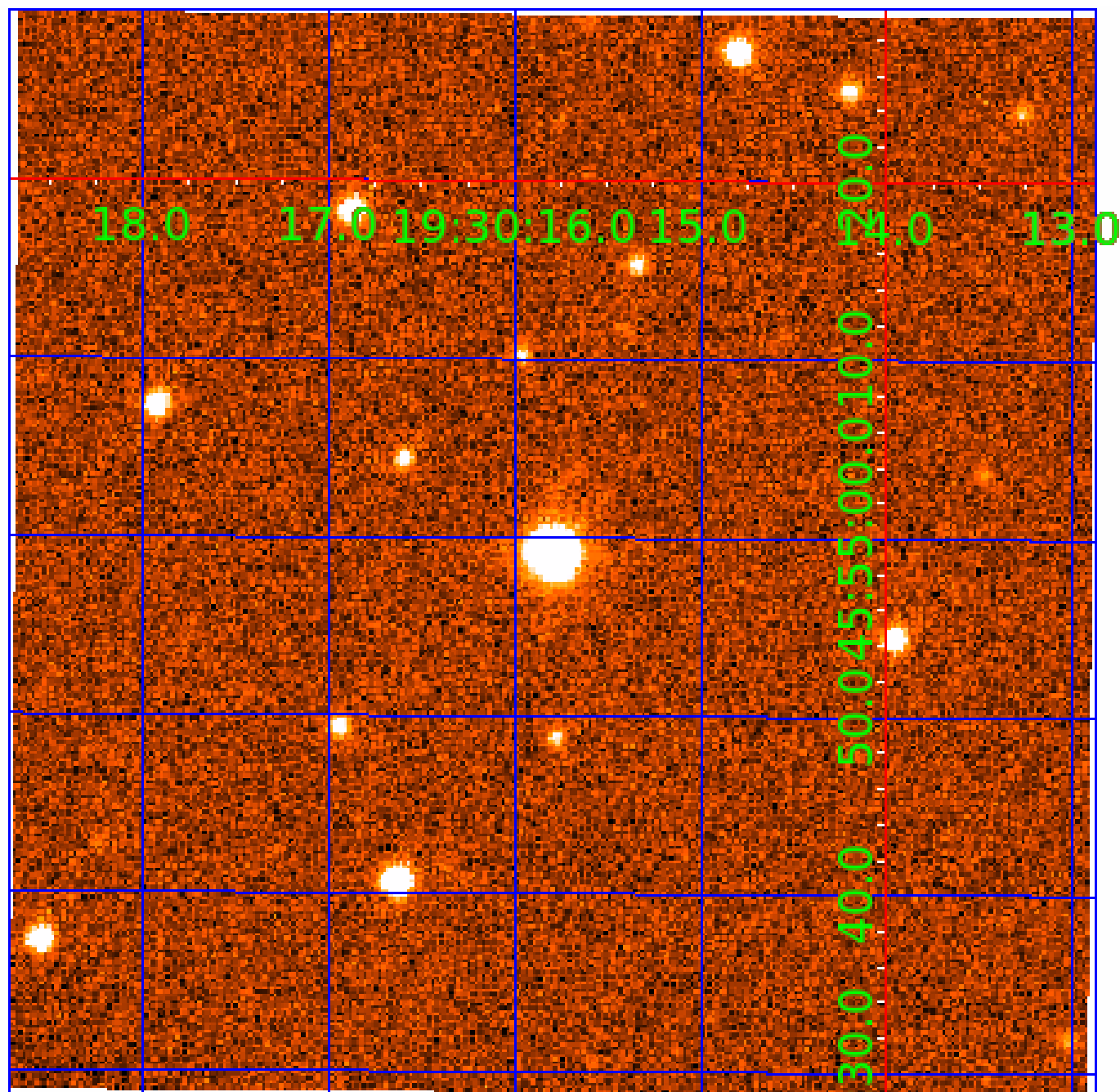


fluxWeightedCentroids, Planet 4 of 6



UKIRT Image

Declination



KIC 009405865

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})
009405865-01	OBS	No	2.687938	132.916423	32.9	7.937	11.2	8.9	1.58	7193	1.16	3334.88
009405865-02	OBS	No	2.688062	134.104001	33.6	1.293	11.5	5.6	1.58	7193	1.07	3334.68
009405865-03	OBS	No	2.688136	134.075997	40.7	8.228	12.8	7.5	1.58	7193	1.17	3334.55
009405865-04	OBS	No	2.687889	133.511935	49.4	9.086	12.4	14.2	1.58	7193	1.29	3334.96
009405865-05	OBS	No	61.502893	190.200197	187.7	6.572	8.2	7.1	1.58	7193	2.37	51.34
009405865-06	OBS	No	115.844151	210.325697	347.2	2.542	7.5	8.0	1.58	7193	3.38	22.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009405865-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009405865-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—HALO_GHOST
009405865-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD
009405865-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFFS
009405865-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_MEAS
009405865-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

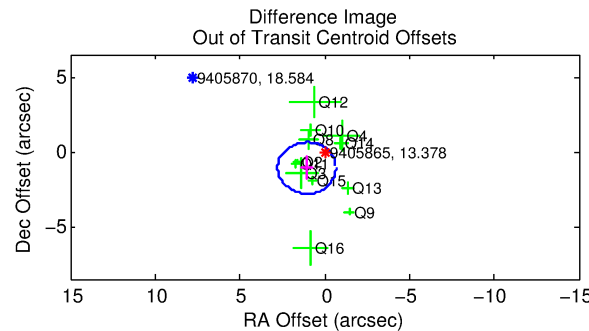
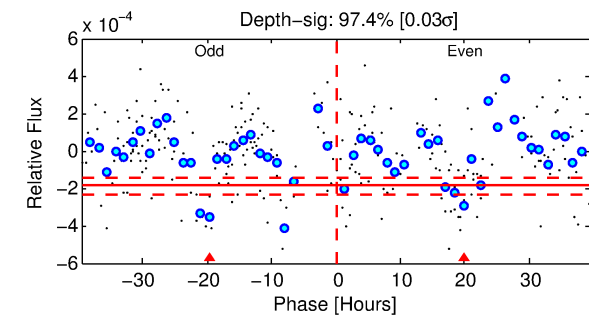
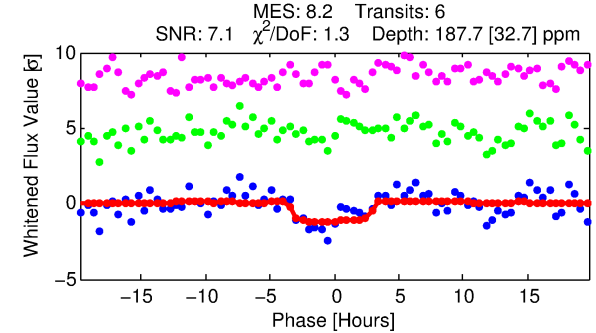
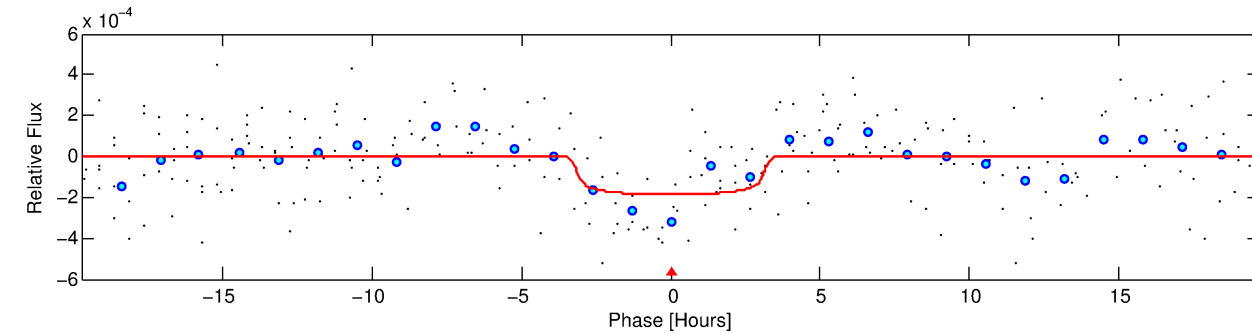
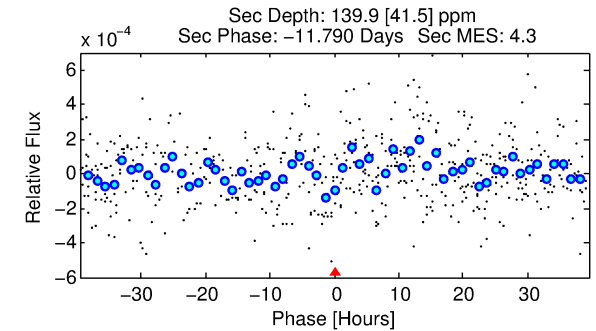
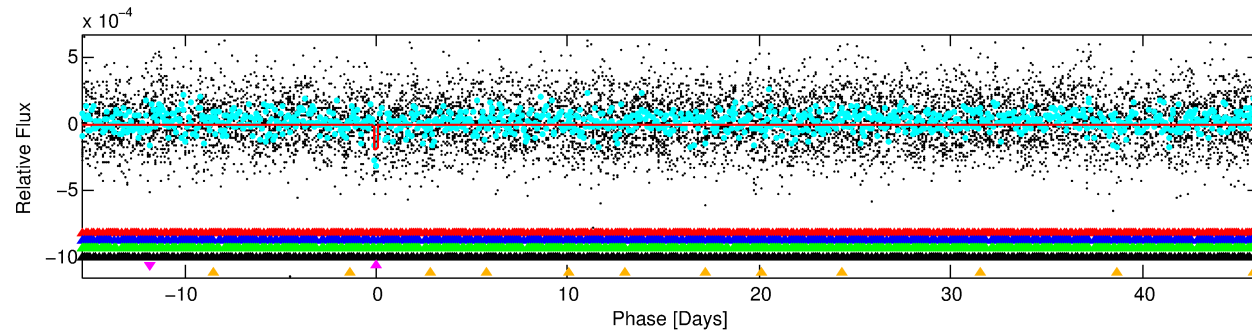
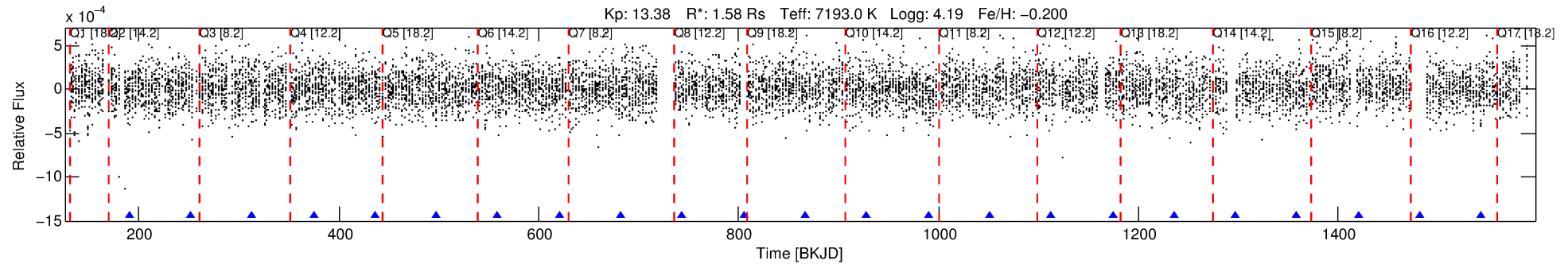
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009405865-05

No Significant Match Found

DV One-Page Summary

KIC: 9405865 Candidate: 5 of 6 Period: 61.503 d



DV Fit Results:

Period = 61.50289 [0.00183] d
Epoch = 190.2002 [0.0233] BKJD
Rp/R* = 0.0138 [0.0212]
a/R* = 45.75 [437.06]
b = 0.79 [4.67]
Seff = 51.34 [20.50]
Teq = 683 [68] K
Rp = 2.37 [3.74] Re
a = 0.3415 [0.0880] AU
Ag = 1592.53 [4969.74] [0.32σ]
Teffp = 6667 [5173] K [1.16σ]

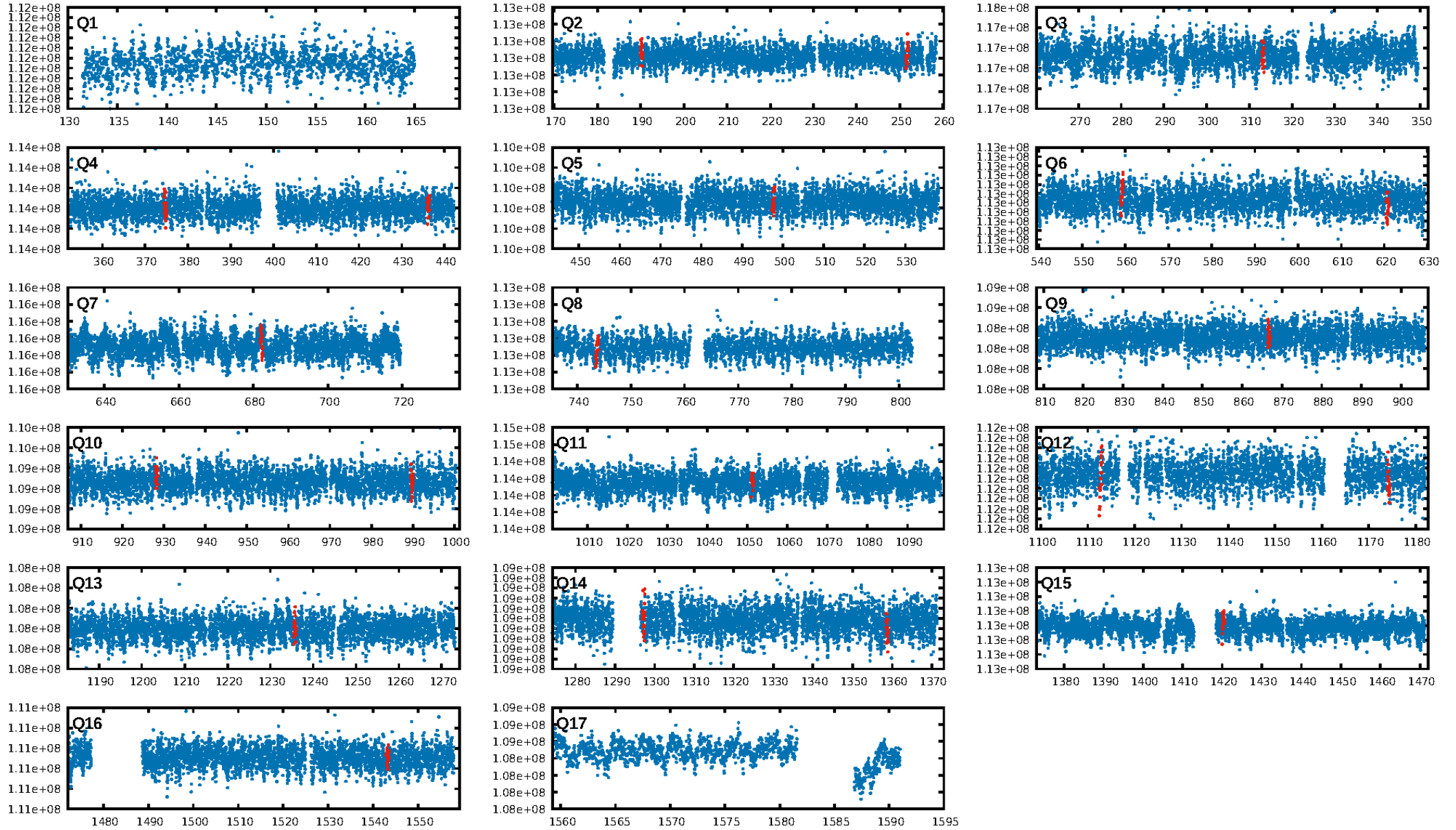
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [134.04σ]
LongPeriod-sig: 100.0% [185.09σ]
ModelChiSquare2-sig: 12.5%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 3.53e-11
RollingBand-fgt: 1.00 [6/6]
GhostDiagnostic-chr: 1.376
Centroid-sig: 2.3%
Centroid-so: 1.464 arcsec [2.11σ]
OotOffset-rm: 1.513 arcsec [2.64σ]
OotOffset-st: 3/3/4/2 [12]
KicOffset-rm: 1.550 arcsec [2.94σ]
KicOffset-st: 3/3/4/2 [12]
DiffImageQuality-fgm: 0.25 [3/12]
DiffImageOverlap-fno: 0.07 [1/15]

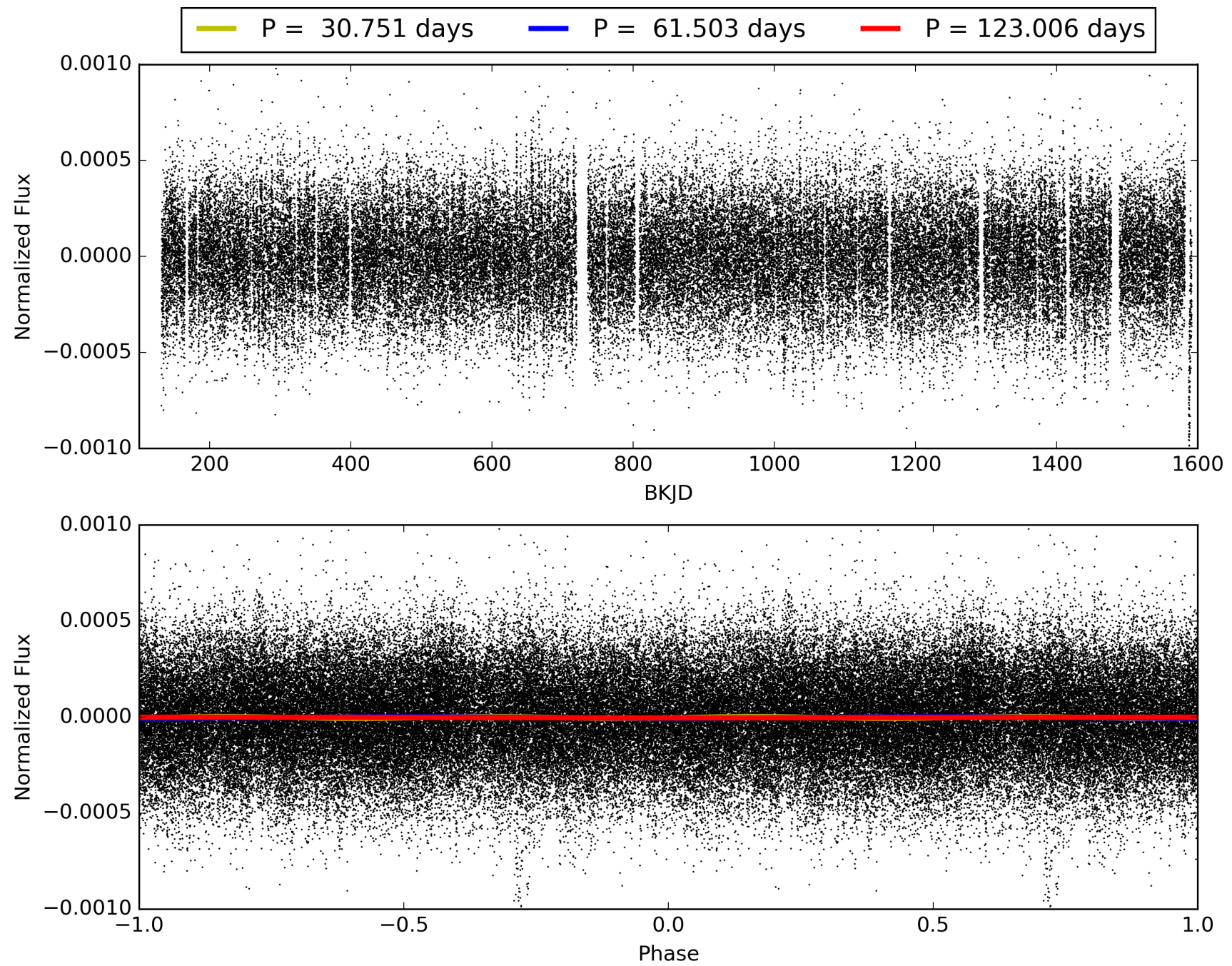
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 16:28:56 Z

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

TCE 009405865-05, PDC Light Curves

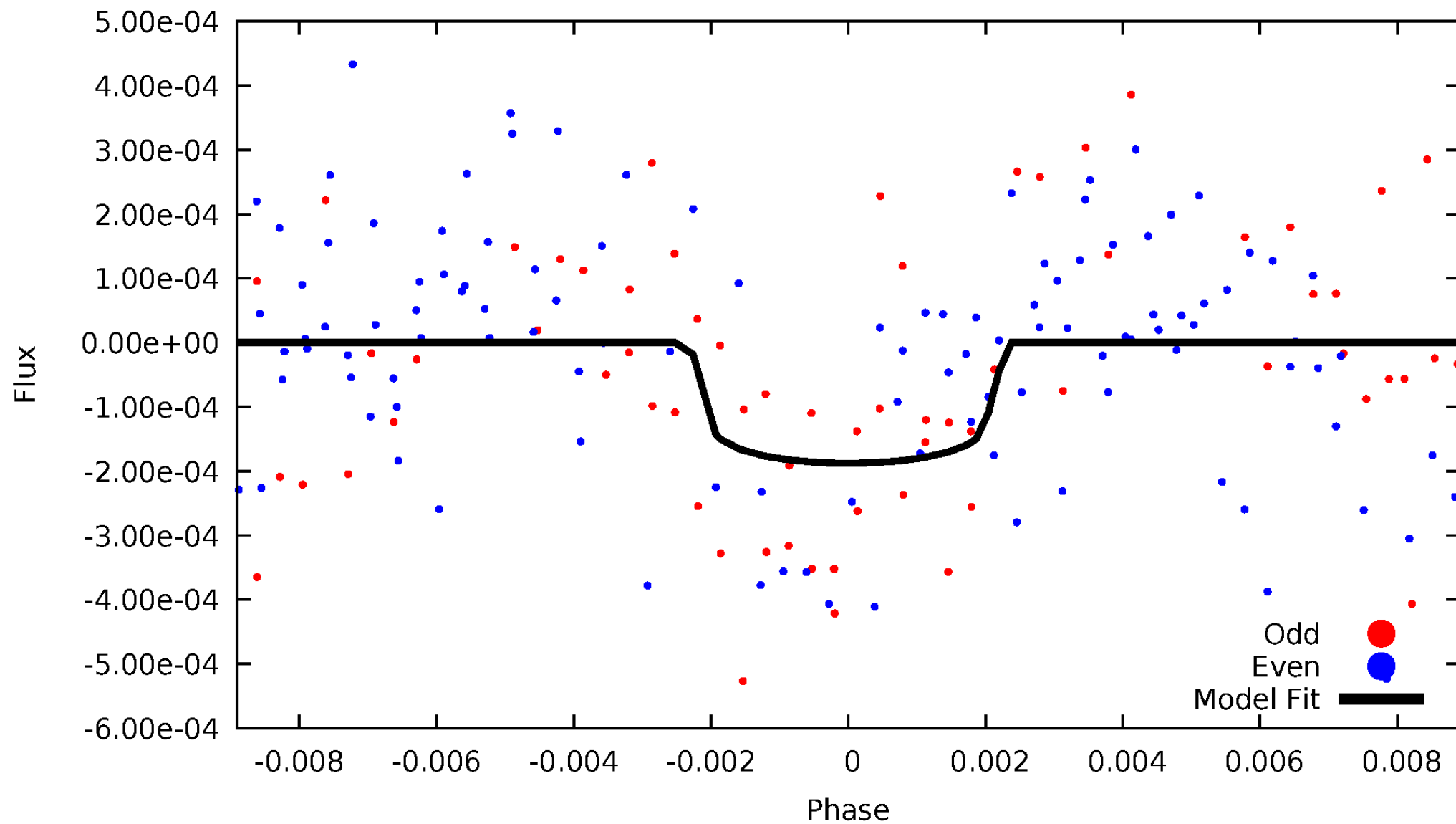


TCE 009405865-05



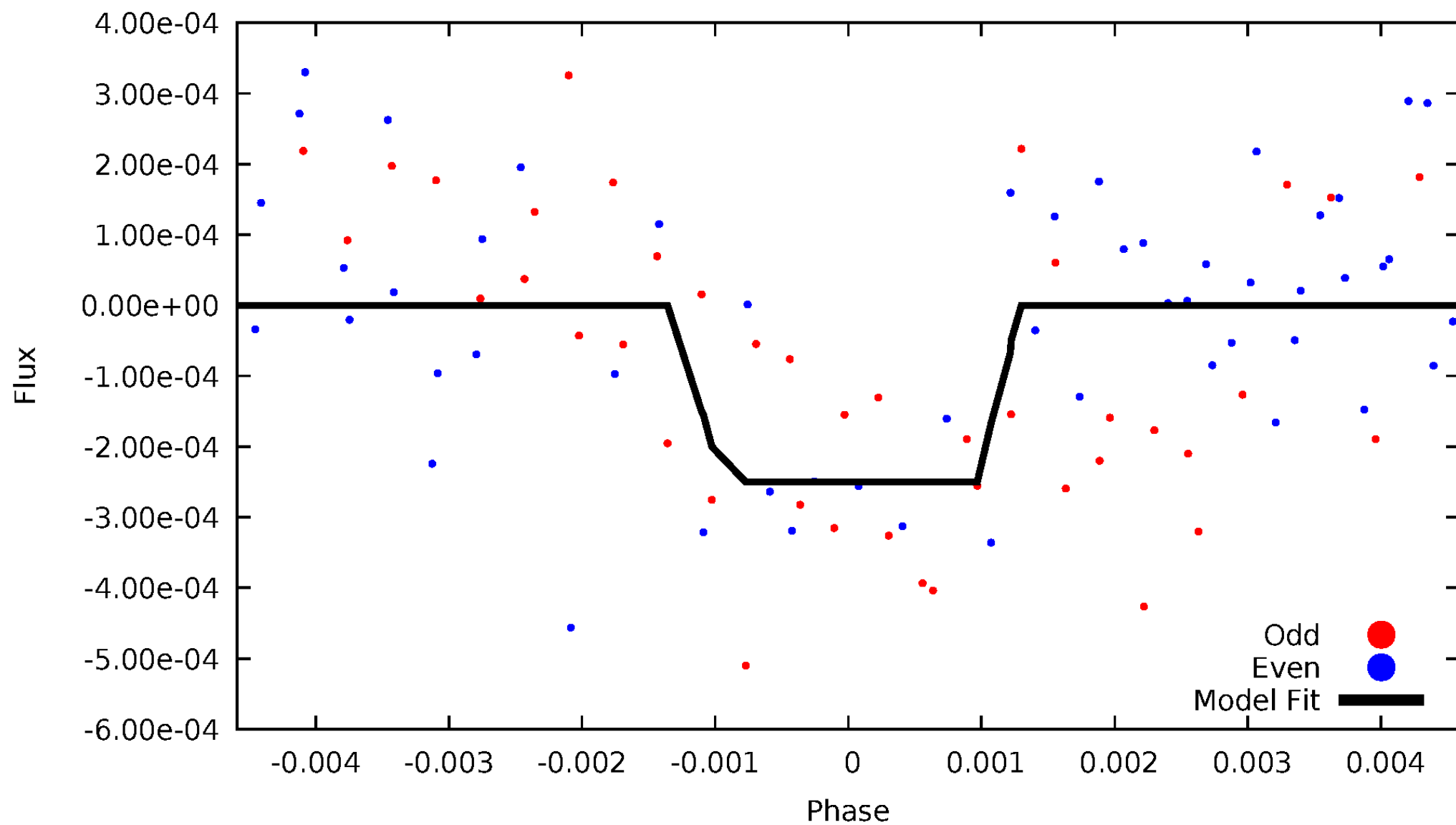
DV Odd/Even

TCE 009405865-05



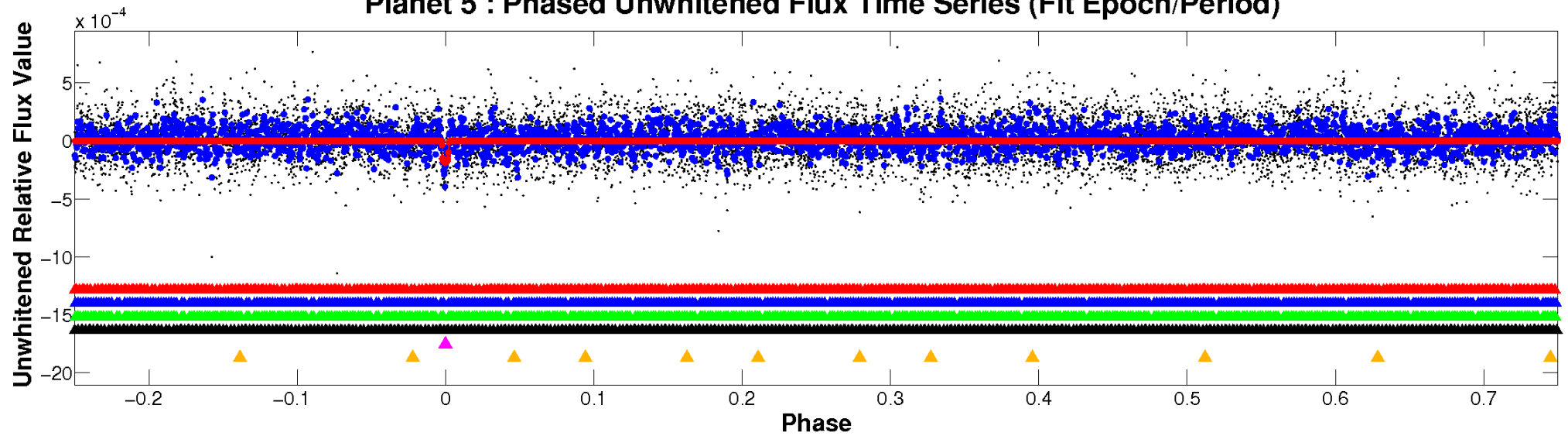
ALT Odd/Even

TCE 009405865-05

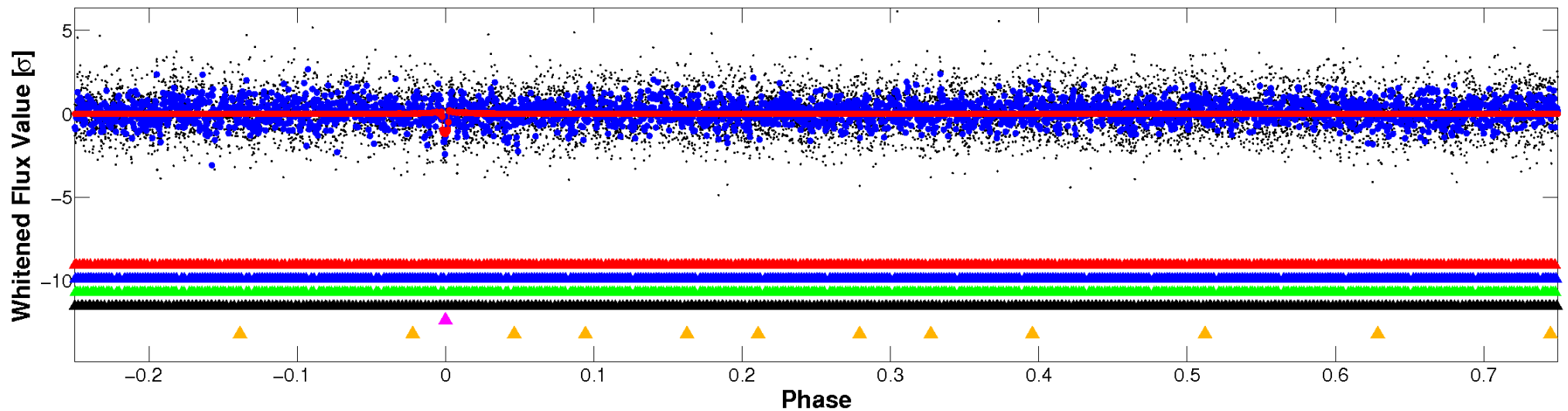


Non-Whitened Vs. Whitened Light Curve

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

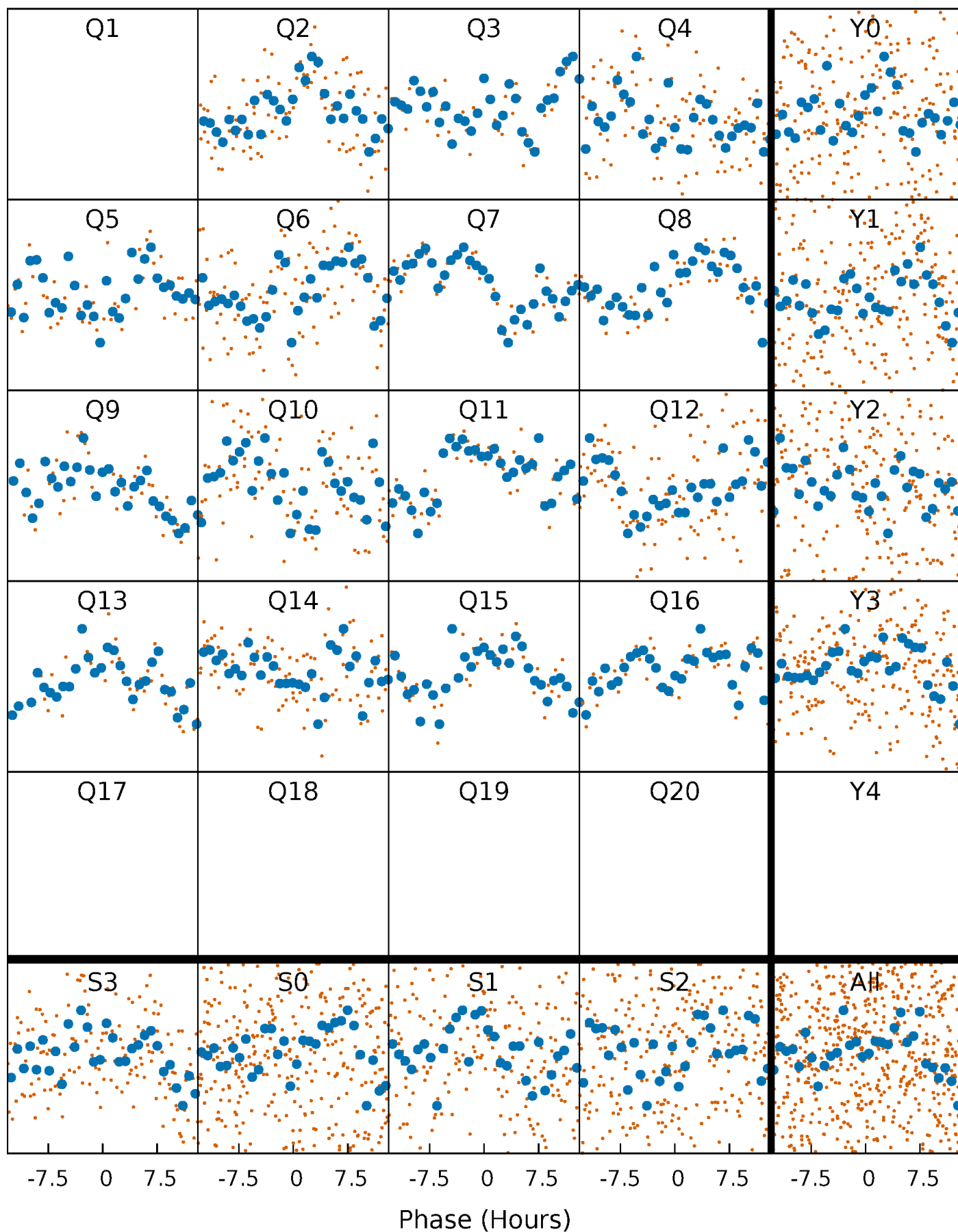


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



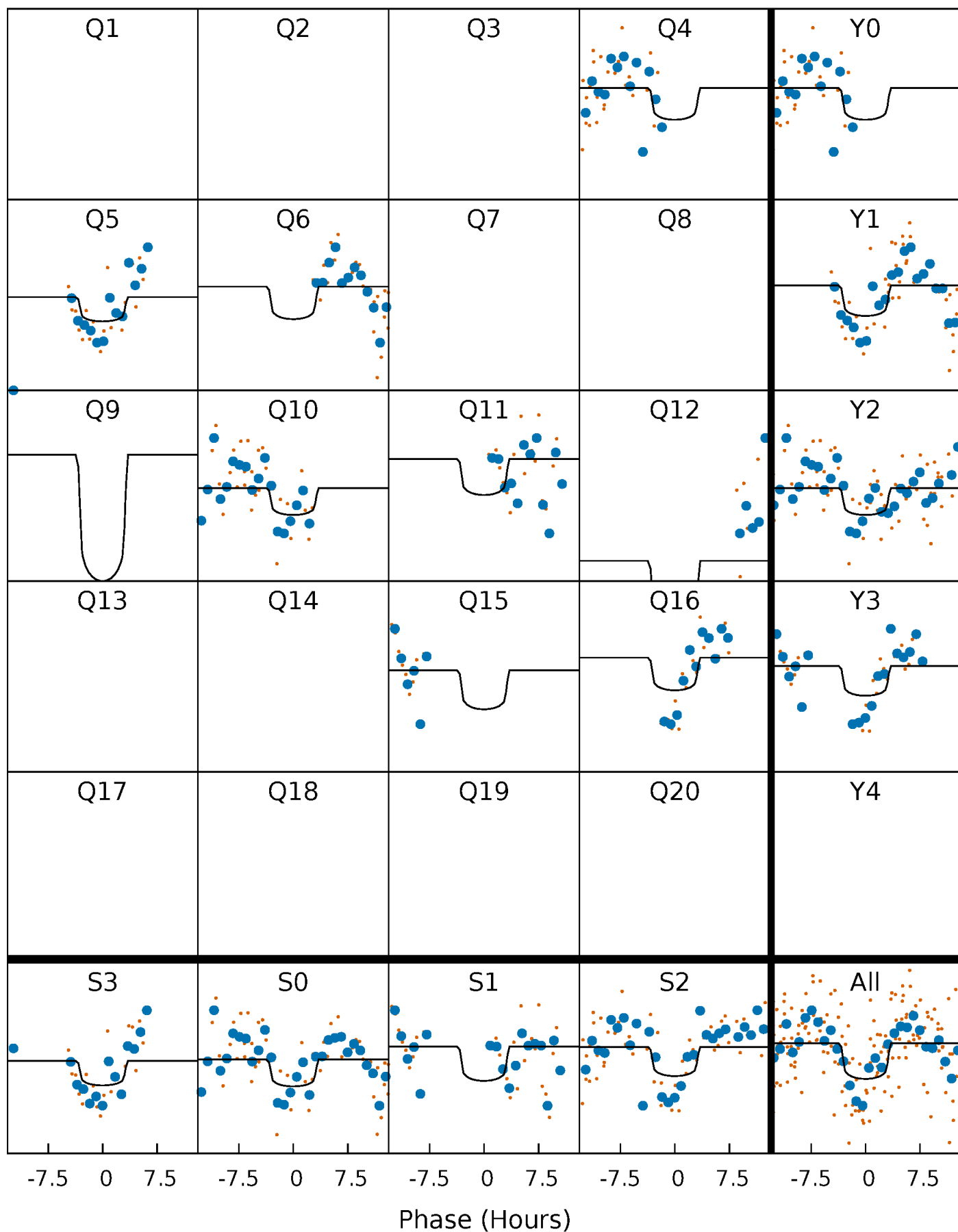
PDC Quarter-Phased Transit Curves

TCE 009405865-05 P= 61.502893 Days $T_0=190.200197$ (BKJD)



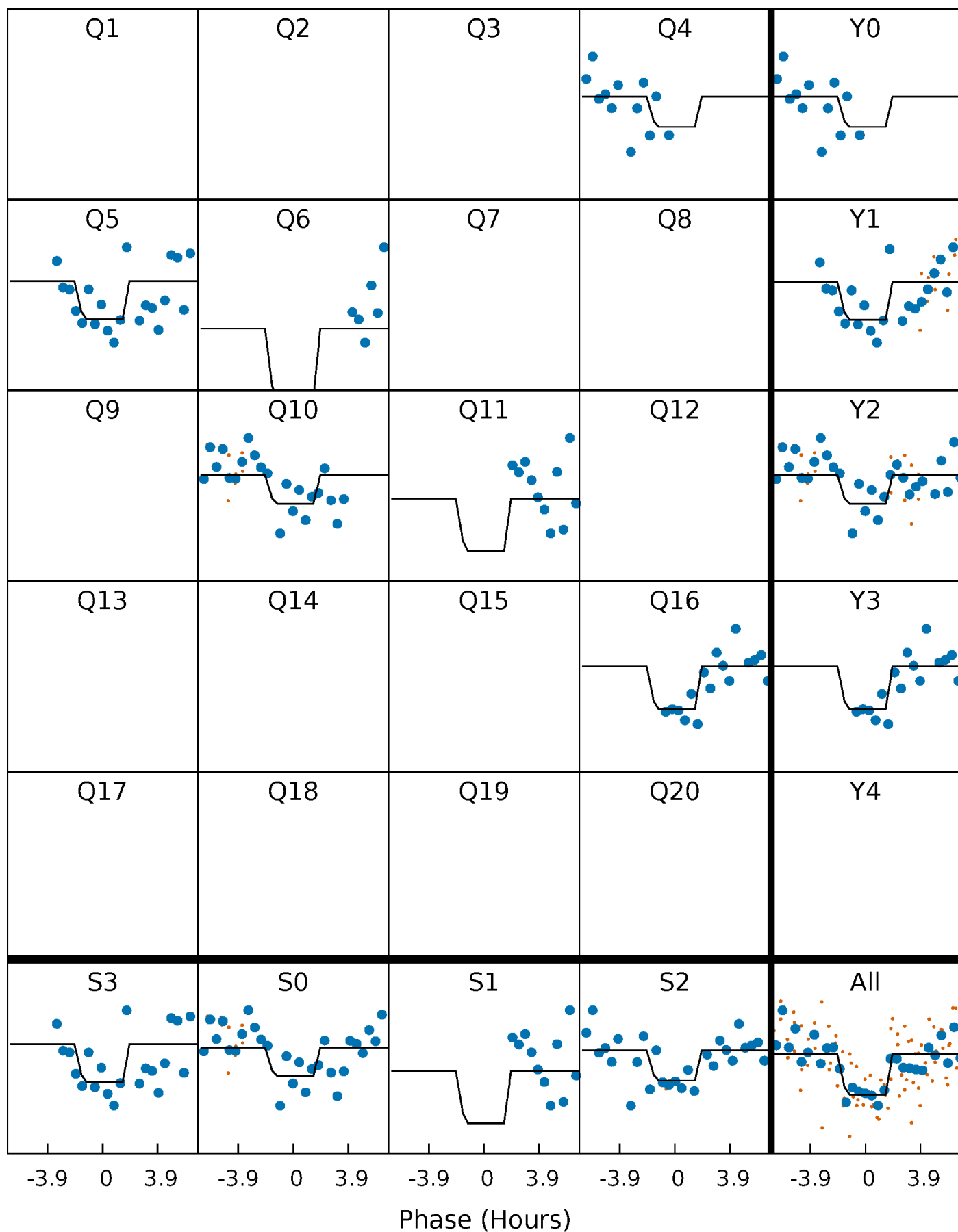
DV Quarter-Phased Transit Curves

TCE 009405865-05 P= 61.502893 Days $T_0=190.200197$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

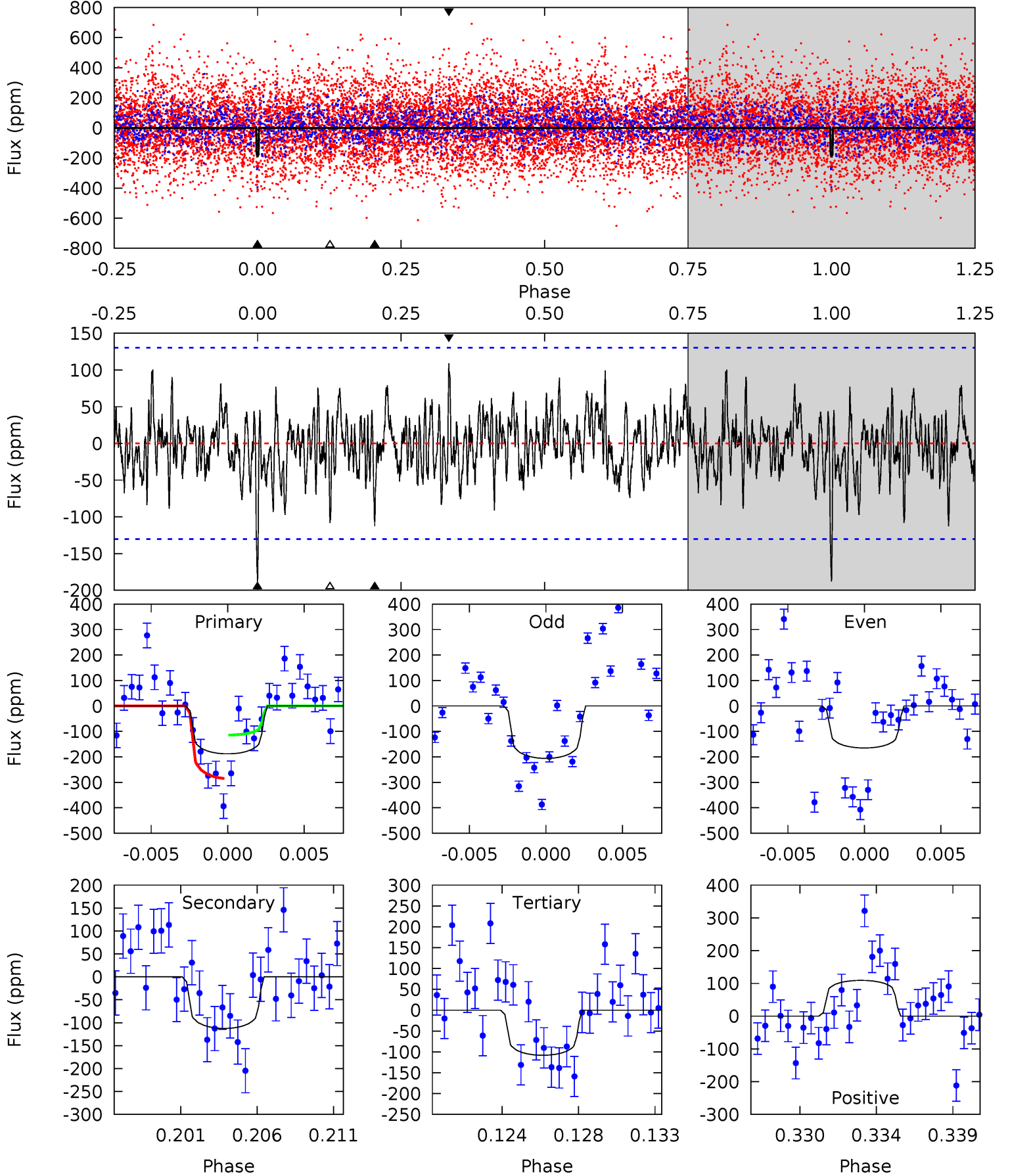
TCE 009405865-05 P= 61.503417 Days $T_0=190.146310$ (BKJD)



DV Model-Shift Uniqueness Test

009405865-05, P = 61.502893 Days, E = 128.697304 Days

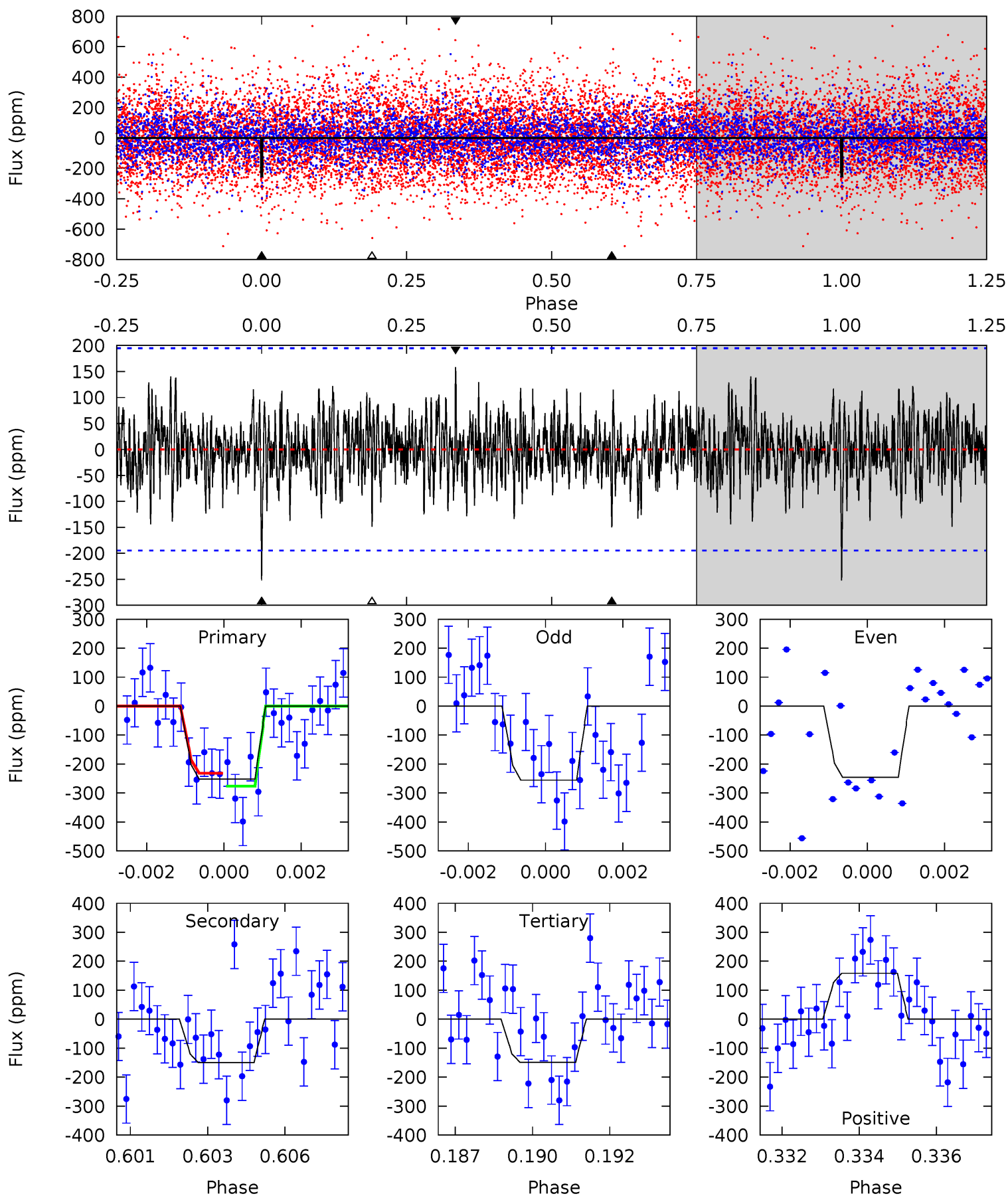
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.47	4.47	4.30	4.33	5.17	2.84	1.32	3.17	3.13	0.17	0.13	0.81	0.82	0.37	3.33



Alt Model-Shift Uniqueness Test

009405865-05, P = 61.503417 Days, E = 128.642893 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.85	4.07	4.04	4.31	5.29	3.04	1.24	2.81	2.54	0.03	-0.24	0.14	0.98	0.39	0.61



Stellar Parameters For KIC 009405865

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7193^{+200}_{-300}	$4.188^{+0.128}_{-0.192}$	$-0.200^{+0.250}_{-0.350}$	$1.580^{+0.501}_{-0.308}$	$1.409^{+0.218}_{-0.218}$	$0.503^{+0.323}_{-0.267}$
	+3%/-4%	+3%/-5%	+125%/-175%	+32%/-19%	+15%/-15%	+64%/-53%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009405865-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-113 ± 25	$3.70^{+3.29}_{-2.53}$	960^{+74}_{-67}	5073^{+4333}_{-1137}	516^{+4457}_{-383}
Alt.	-150 ± 37	$3.88^{+3.63}_{-2.49}$	959^{+72}_{-65}	5287^{+4335}_{-1222}	611^{+4420}_{-454}

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

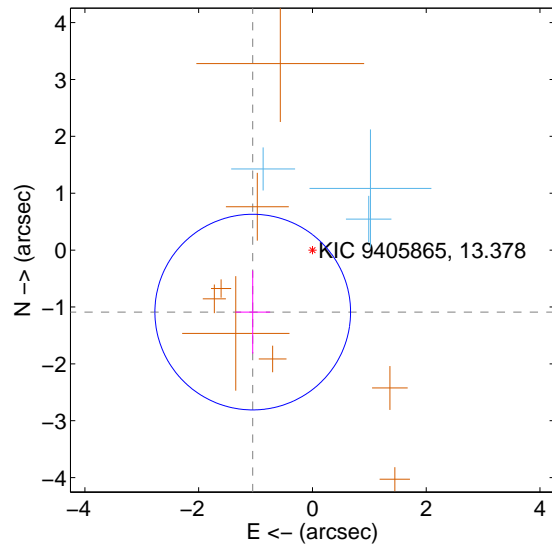
Supplemental centroid analysis for 009405865-05. Kepler magnitude: 13.38. Transit SNR 7.15

There are 3 quarters with good PRF difference image offsets

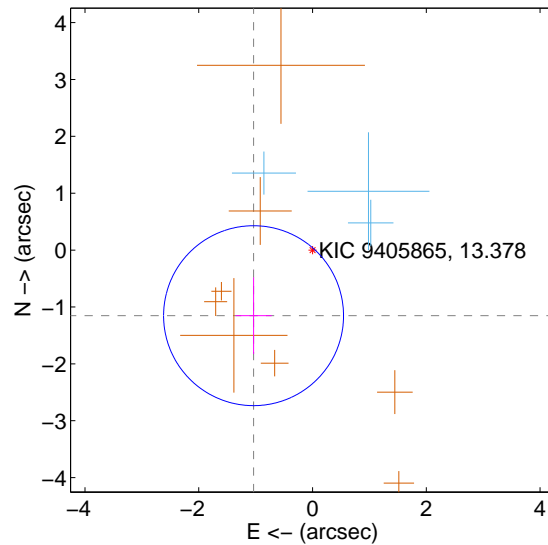
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.513 ± 0.573	2.64	1.050 ± 0.305	-1.090 ± 0.728
PRF-fit source offset from KIC position	1.550 ± 0.527	2.94	1.037 ± 0.318	-1.153 ± 0.674
photometric centroid source offset	1.46 ± 0.69	2.11	1.36 ± 0.69	-0.53 ± 0.70

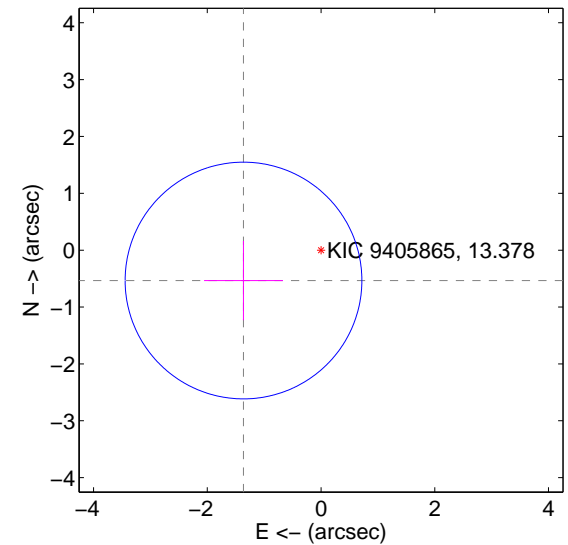
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

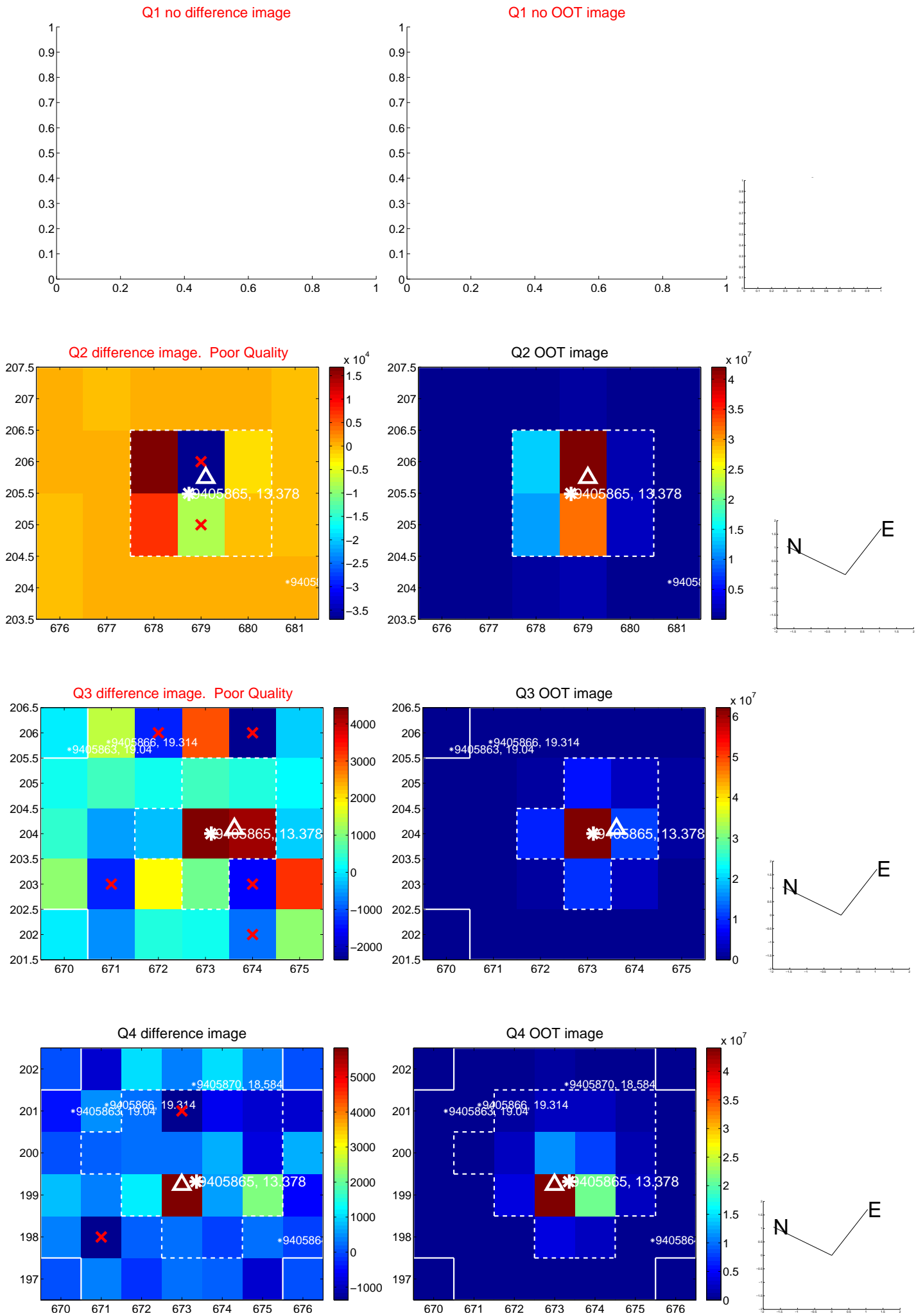


offset from photometric centroids

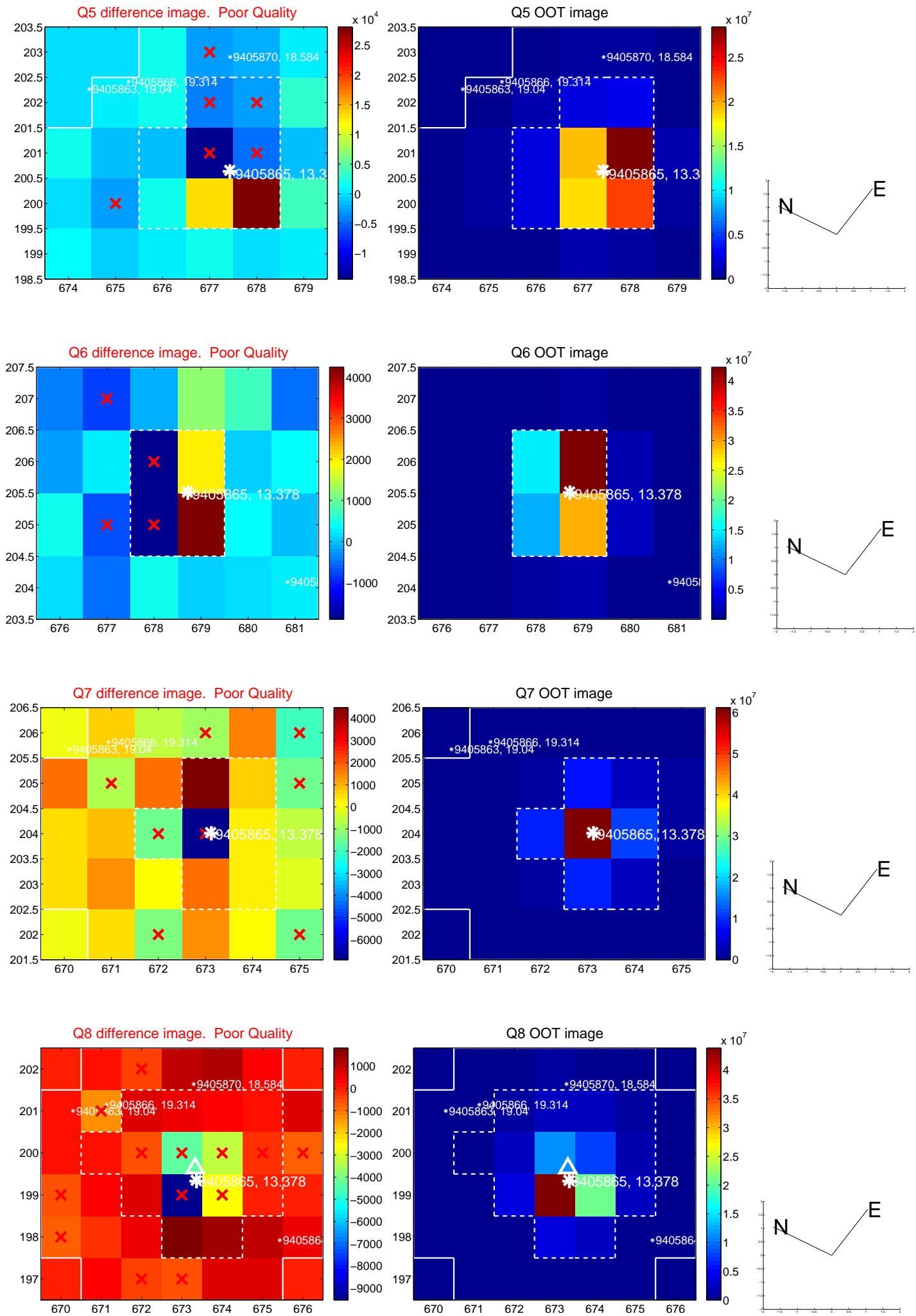


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

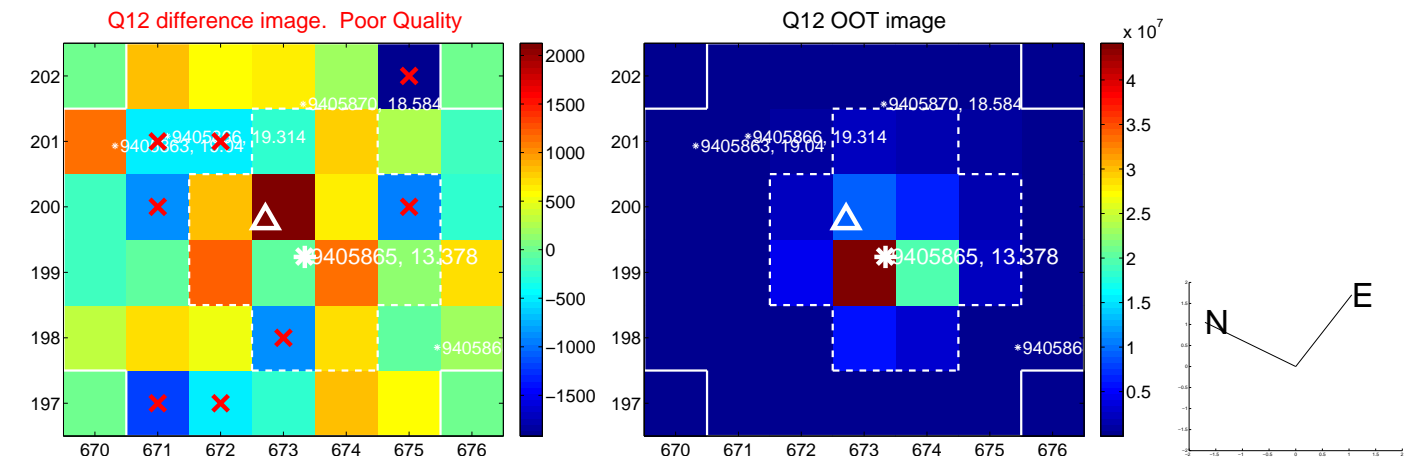
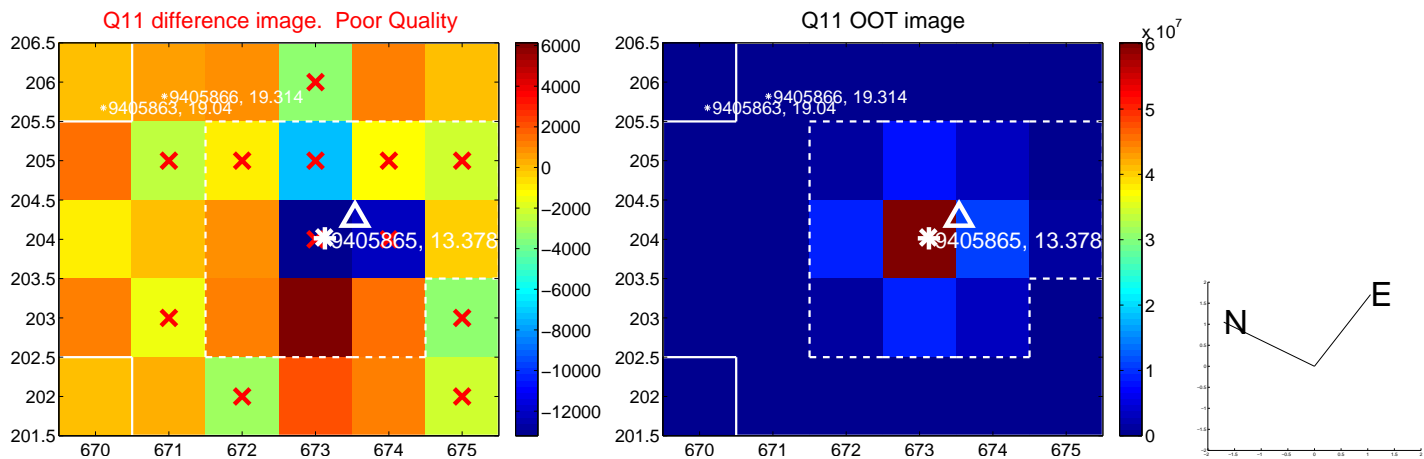
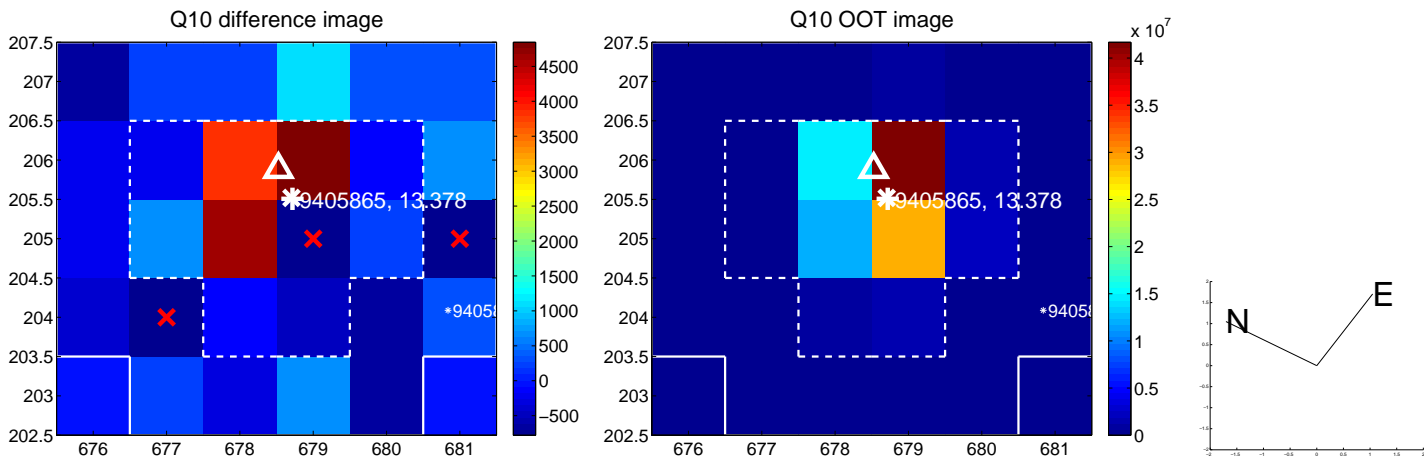
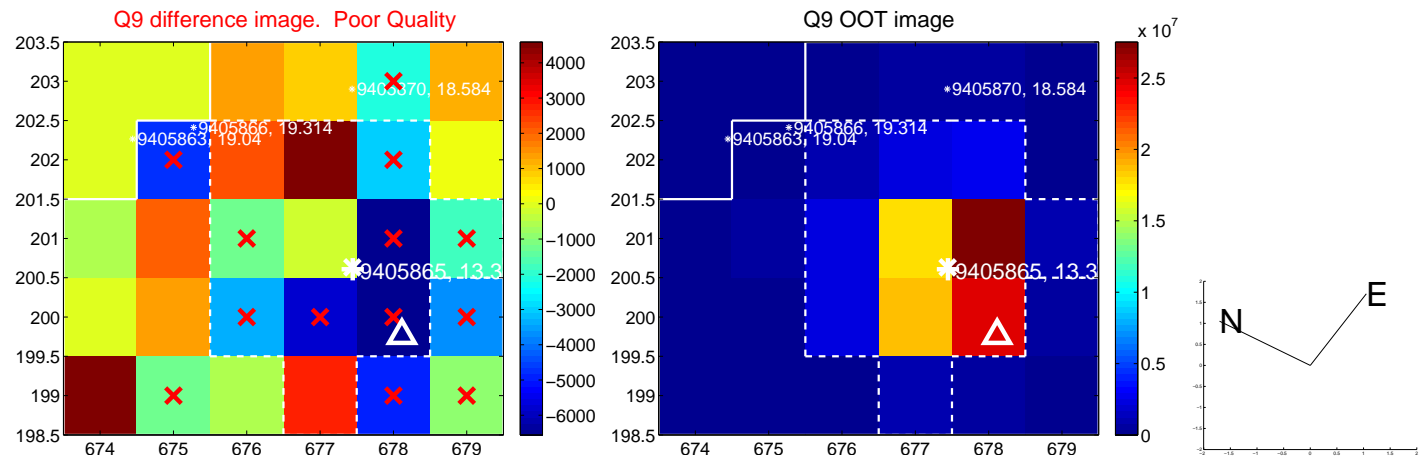
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



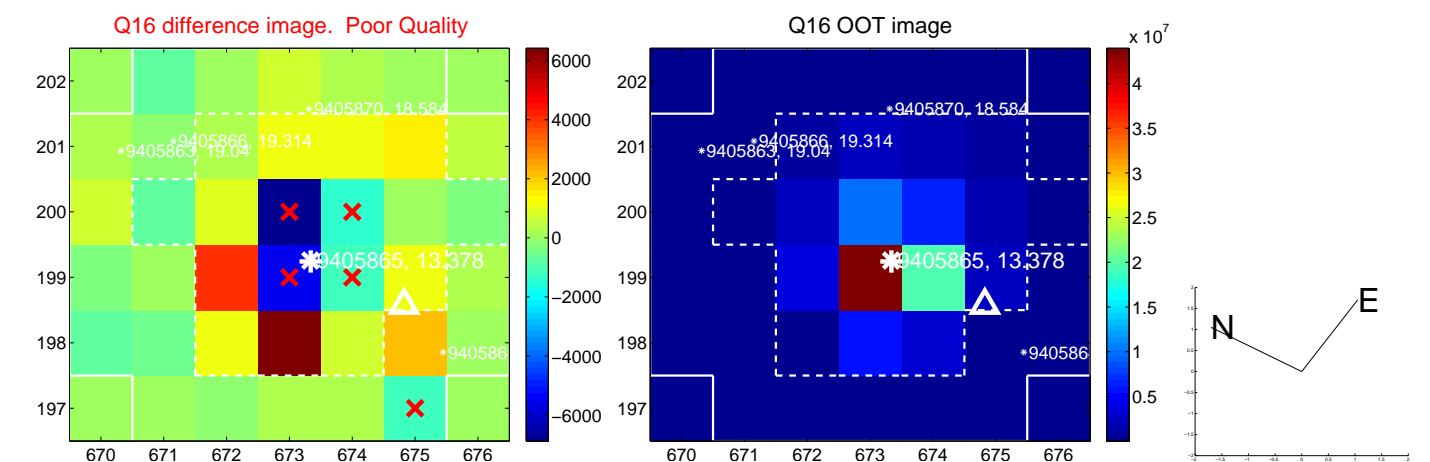
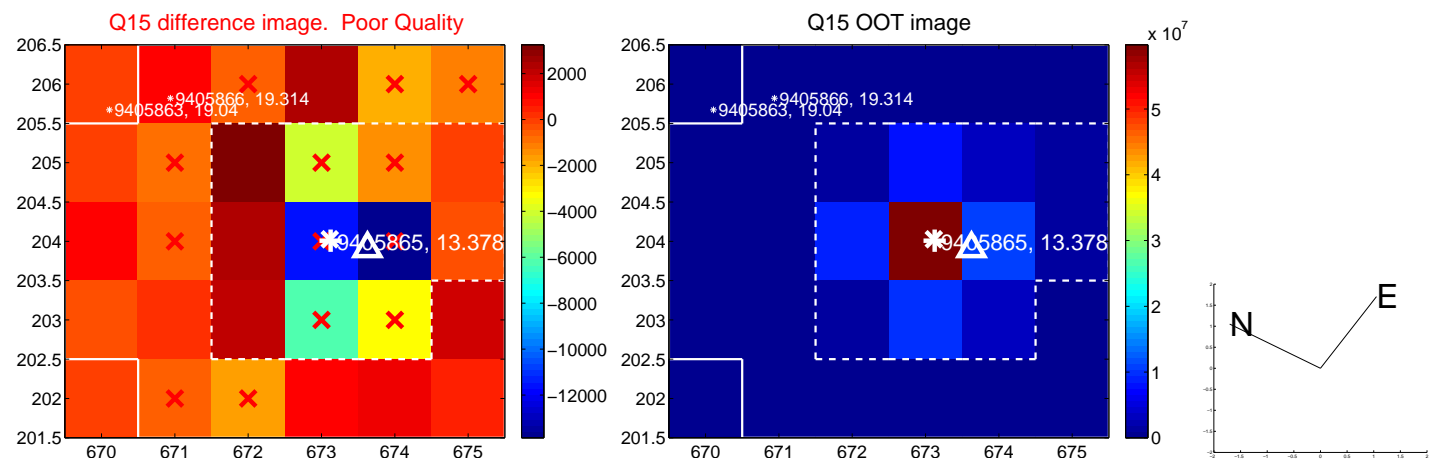
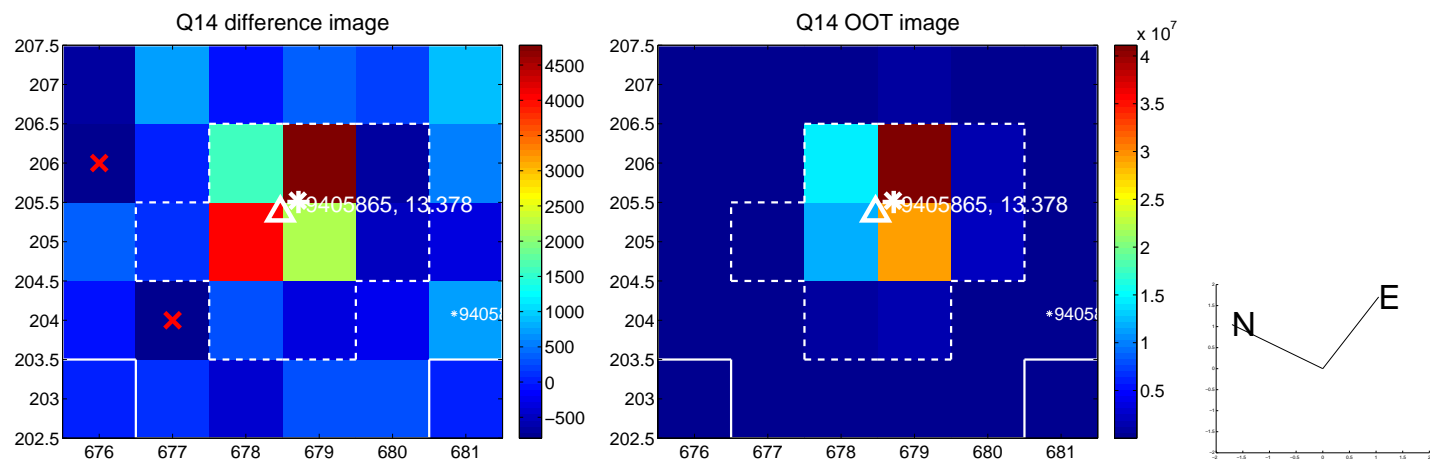
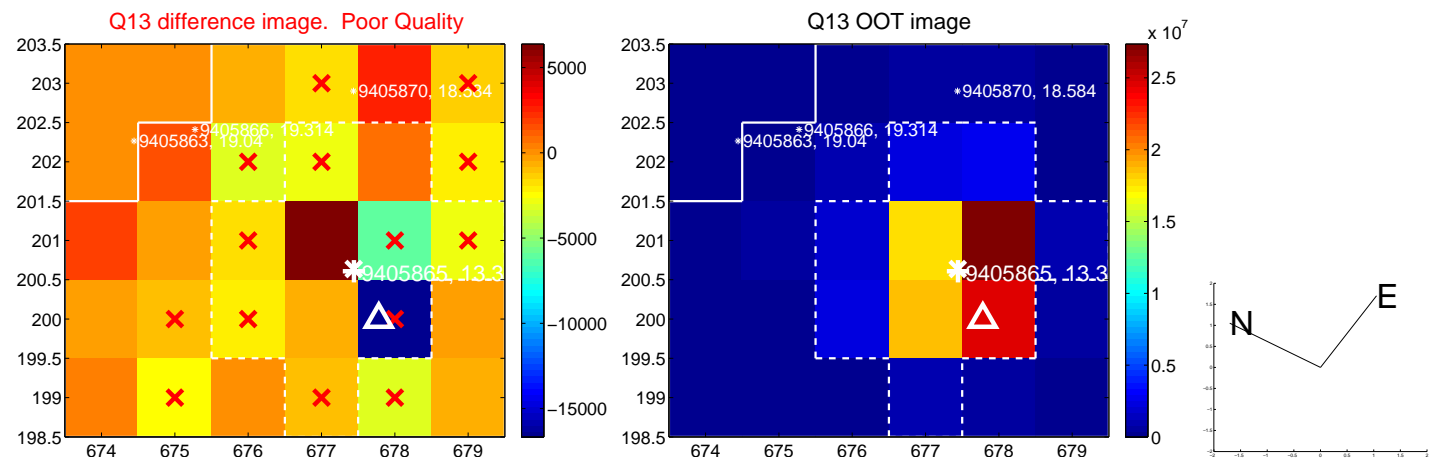
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



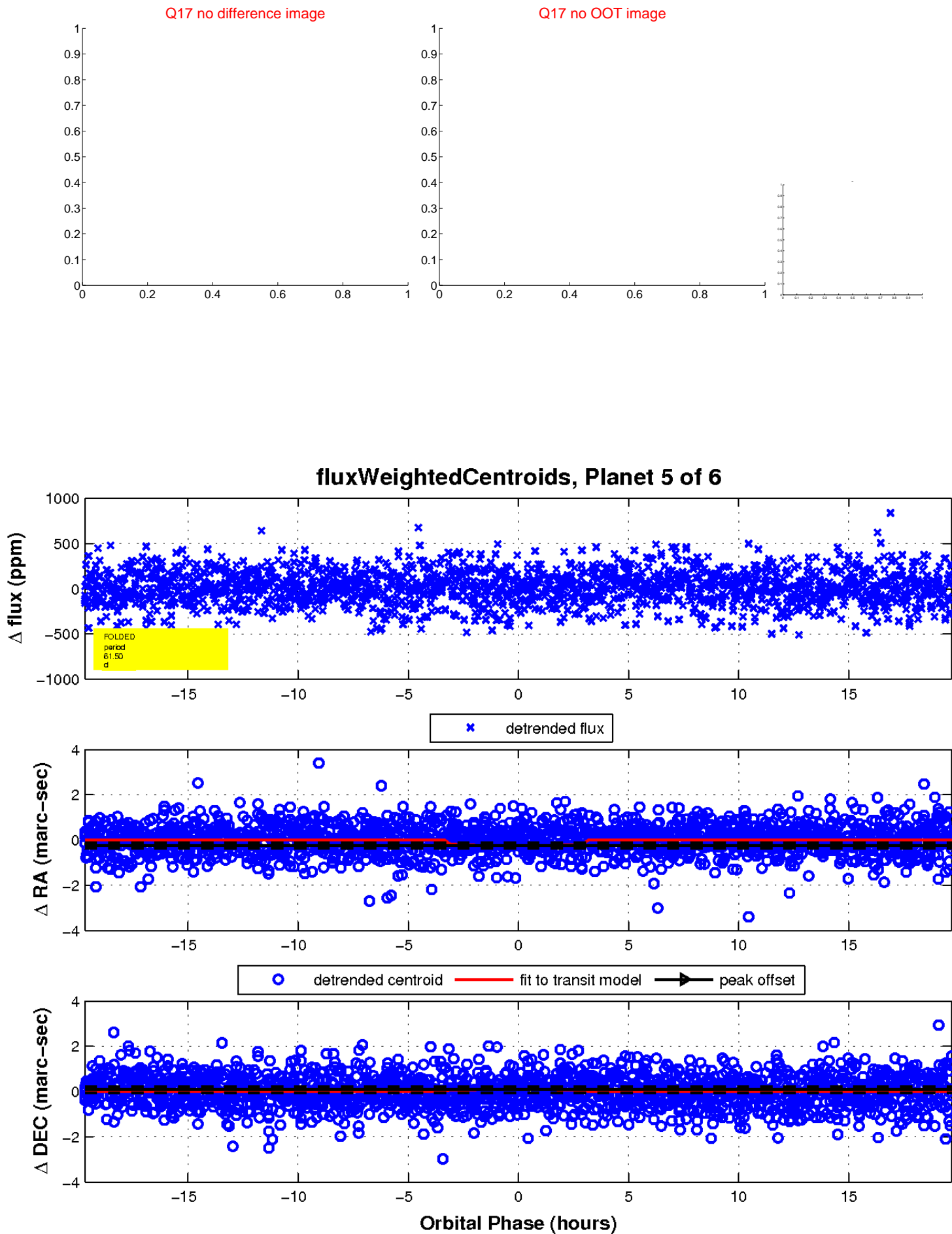
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

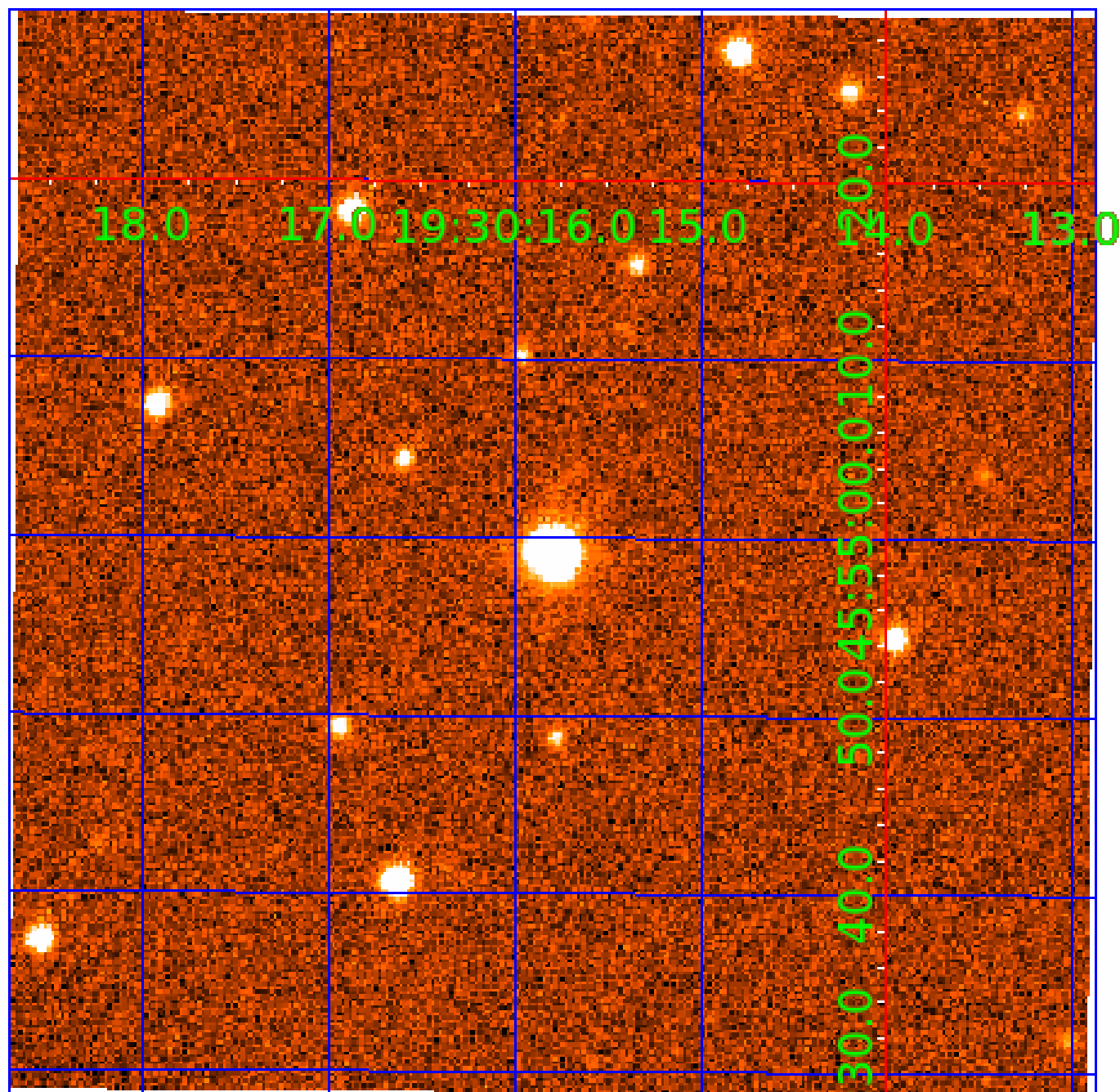


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009405865

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})
009405865-01	OBS	No	2.687938	132.916423	32.9	7.937	11.2	8.9	1.58	7193	1.16	3334.88
009405865-02	OBS	No	2.688062	134.104001	33.6	1.293	11.5	5.6	1.58	7193	1.07	3334.68
009405865-03	OBS	No	2.688136	134.075997	40.7	8.228	12.8	7.5	1.58	7193	1.17	3334.55
009405865-04	OBS	No	2.687889	133.511935	49.4	9.086	12.4	14.2	1.58	7193	1.29	3334.96
009405865-05	OBS	No	61.502893	190.200197	187.7	6.572	8.2	7.1	1.58	7193	2.37	51.34
009405865-06	OBS	No	115.844151	210.325697	347.2	2.542	7.5	8.0	1.58	7193	3.38	22.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009405865-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009405865-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—HALO_GHOST
009405865-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD
009405865-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFFS
009405865-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_MEAS
009405865-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

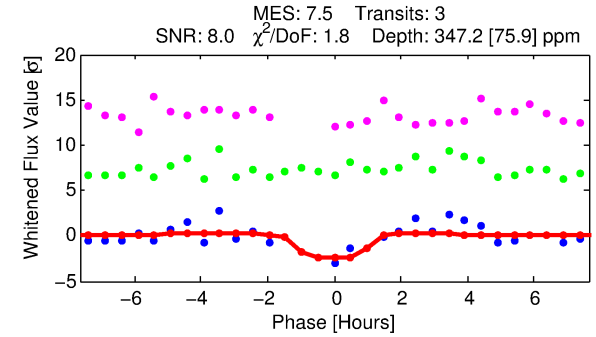
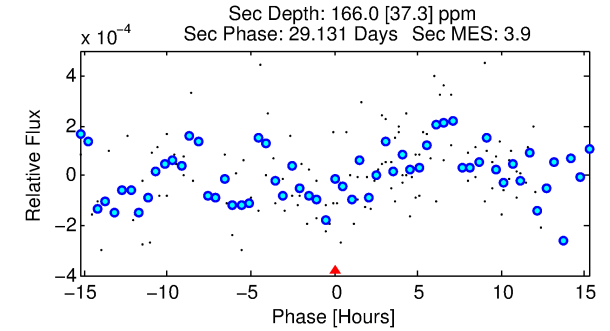
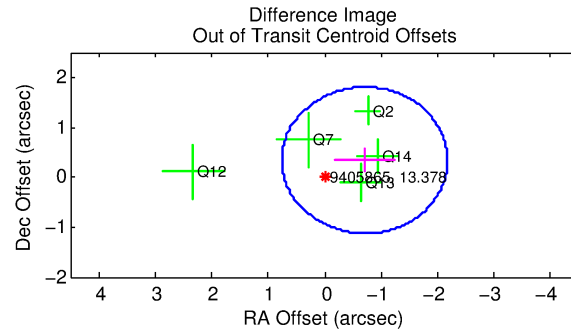
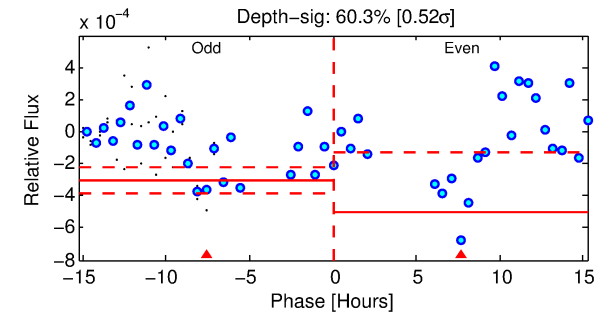
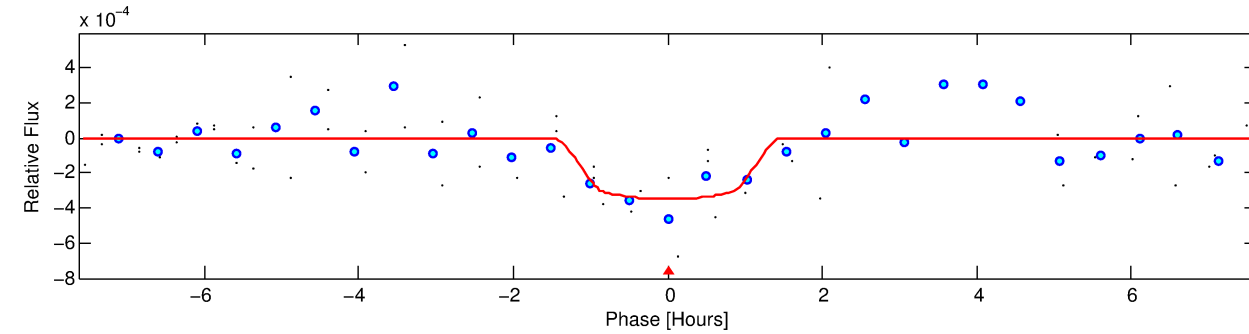
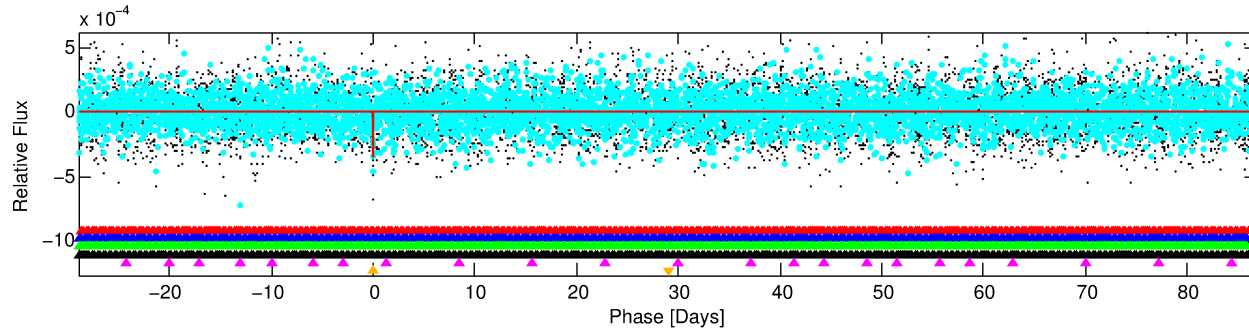
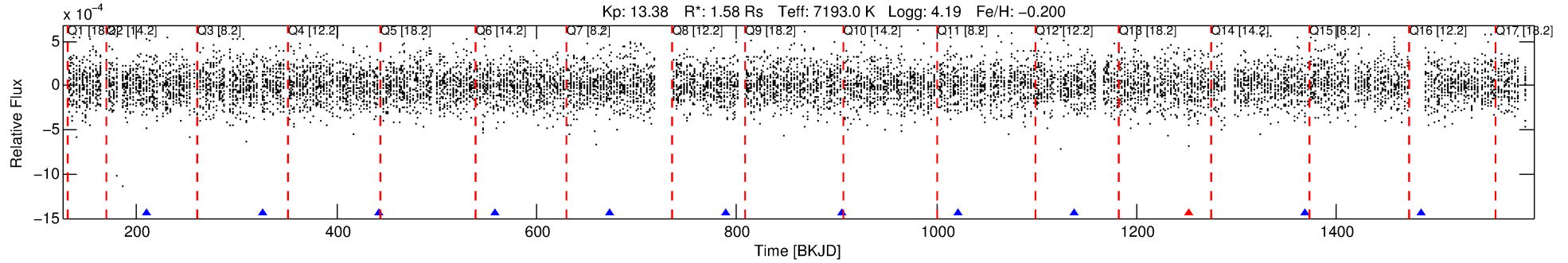
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009405865-06

No Significant Match Found

DV One-Page Summary

KIC: 9405865 Candidate: 6 of 6 Period: 115.844 d



DV Fit Results:

Period = 115.84415 [0.00185] d
Epoch = 210.3257 [0.0163] BKJD
Rp/R* = 0.0196 [0.0177]
a/R* = 177.56 [988.47]
b = 0.88 [1.40]
Seff = 22.07 [8.81]
Teff = 553 [55] K
Rp = 3.38 [3.24] Re
a = 0.5209 [0.1342] AU
Ag = 2171.72 [4042.73] [0.54 σ]
Teffp = 5833 [2674] K [1.97 σ]

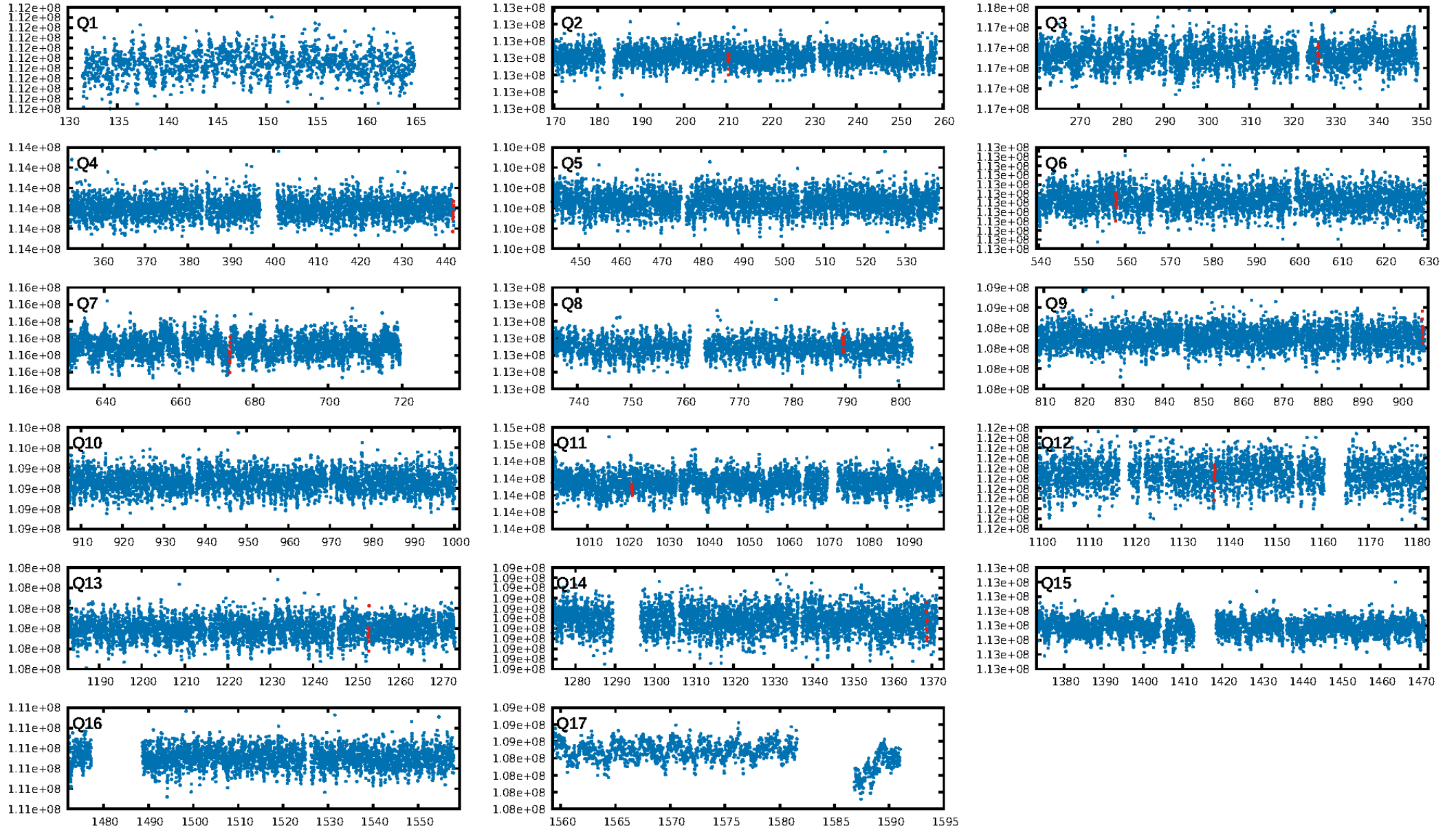
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [185.09 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 17.9%
ModelChiSquareGof-sig: 76.5%
Bootstrap-pfa: 1.88e-09
RollingBand-fgt: 0.67 [2/3]
GhostDiagnostic-chr: 1.676
Centroid-sig: 69.5%
Centroid-so: 0.254 arcsec [0.32 σ]
OotOffset-rm: 0.784 arcsec [1.61 σ]
OotOffset-st: 2/1/1/1 [5]
KicOffset-rm: 0.774 arcsec [1.35 σ]
KicOffset-st: 2/1/1/1 [5]
DiffImageQuality-fgm: 0.80 [4/5]
DiffImageOverlap-fno: 0.33 [3/9]

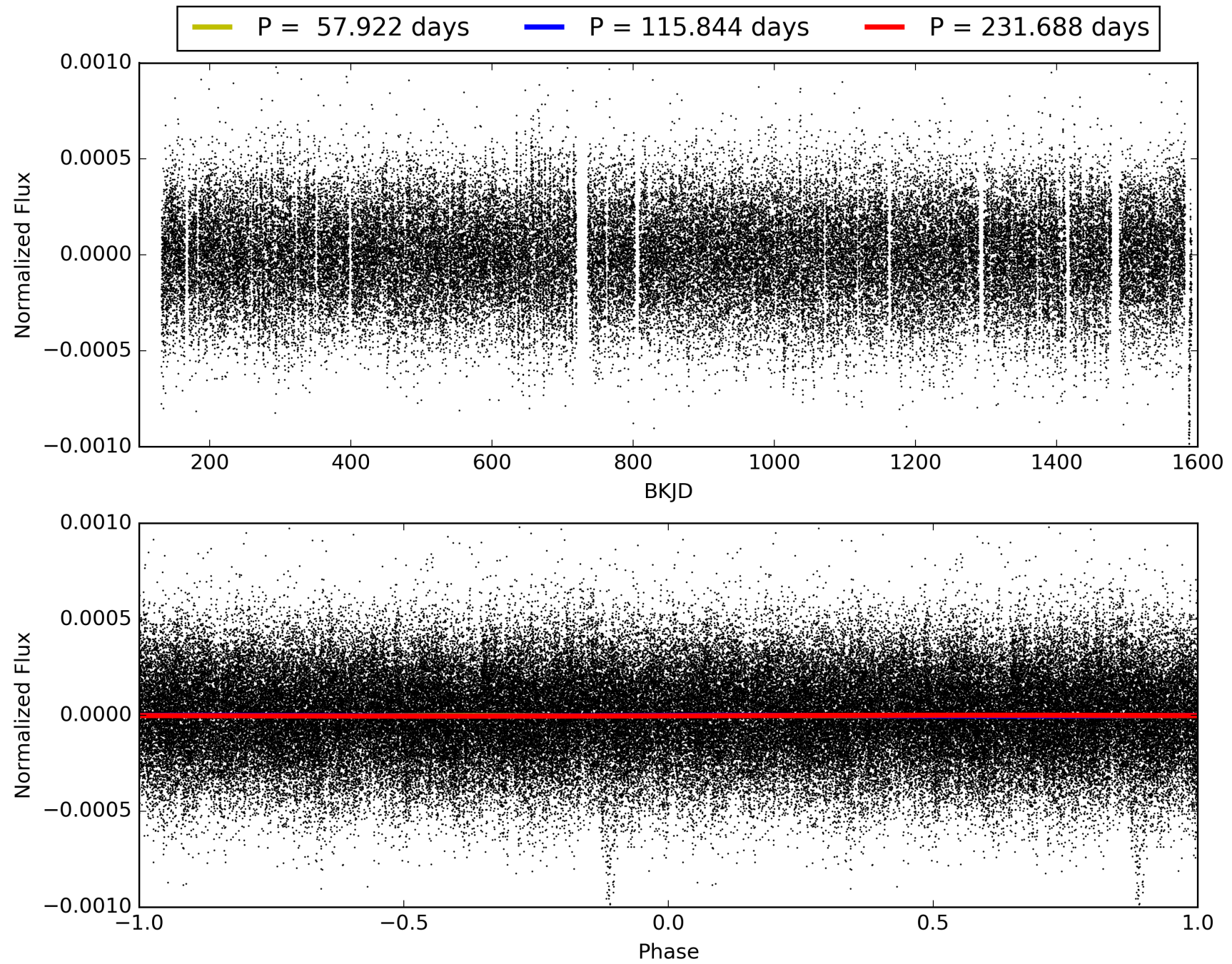
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 16:29:00 Z

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TCE 009405865-06, PDC Light Curves

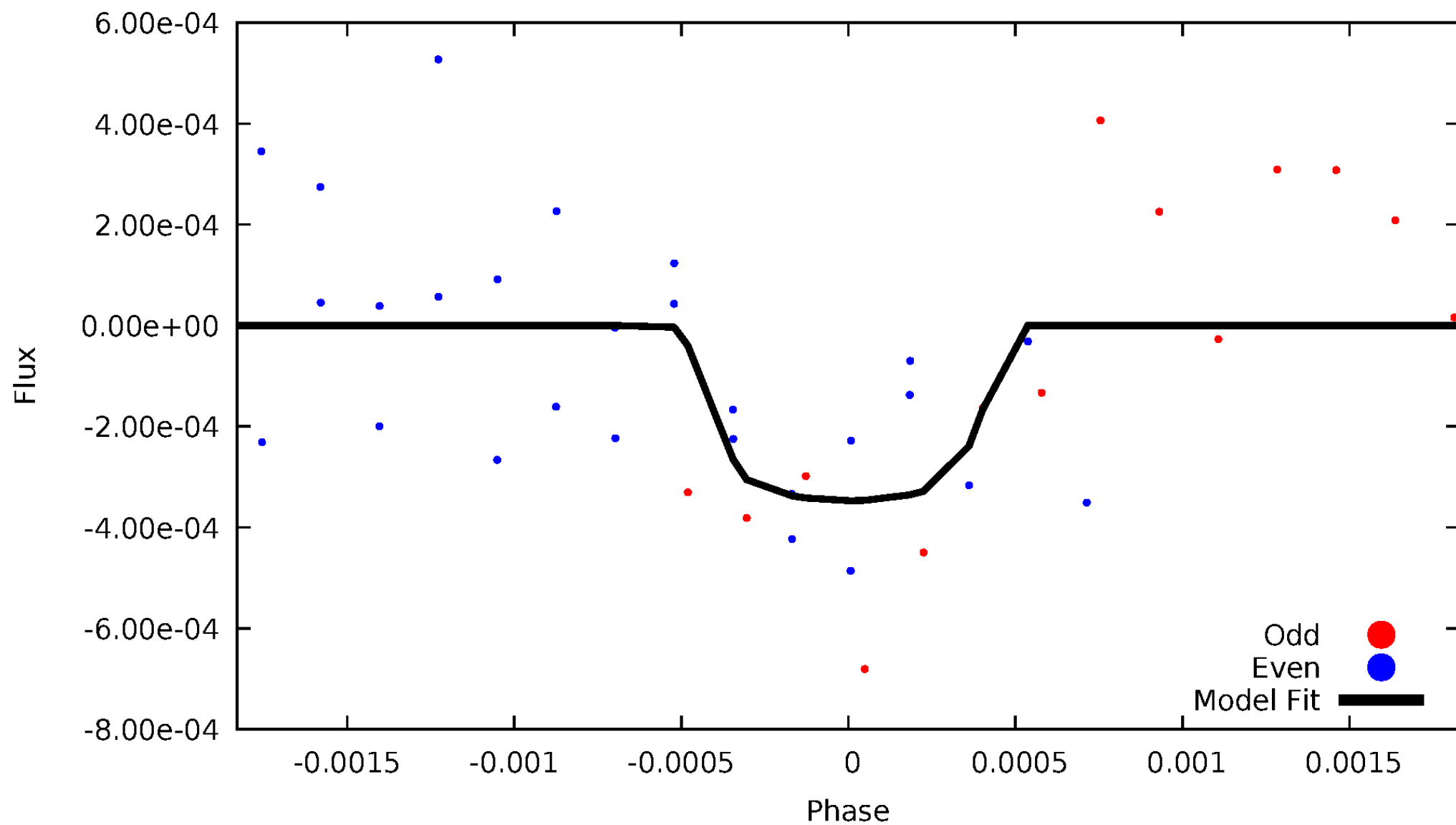


TCE 009405865-06



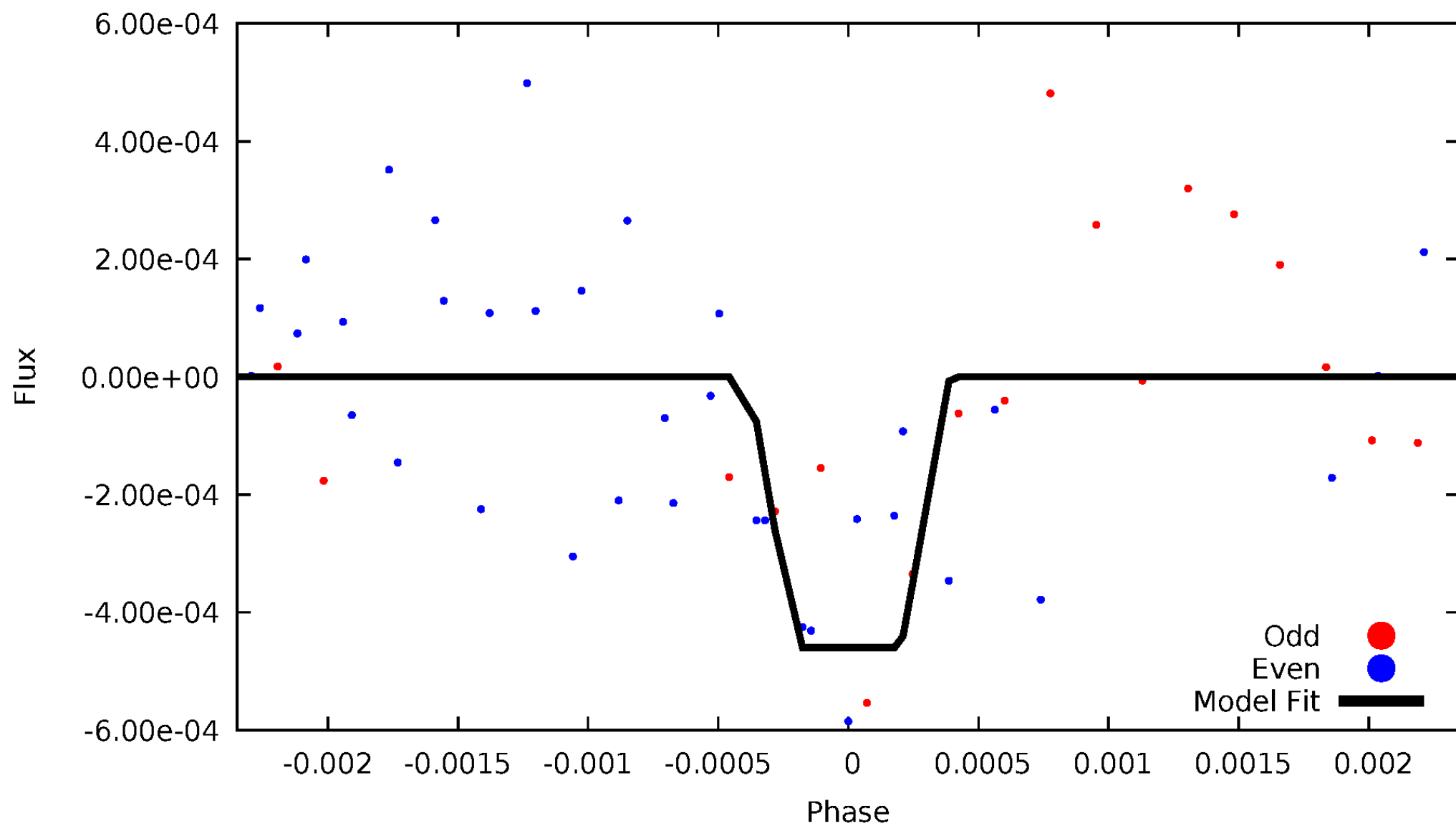
DV Odd/Even

TCE 009405865-06



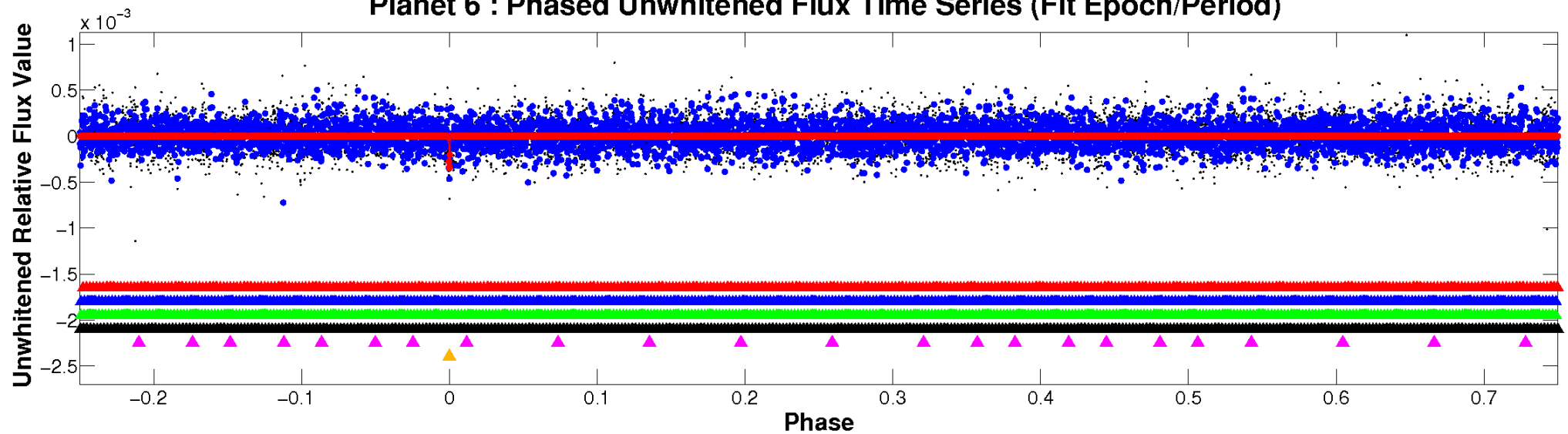
ALT Odd/Even

TCE 009405865-06

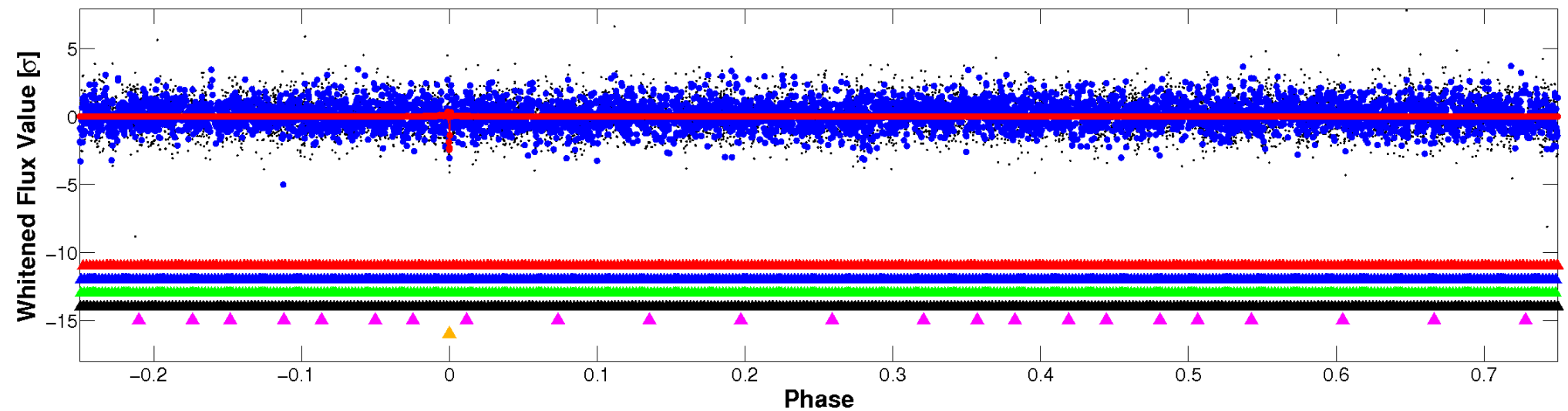


Non-Whitened Vs. Whitened Light Curve

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

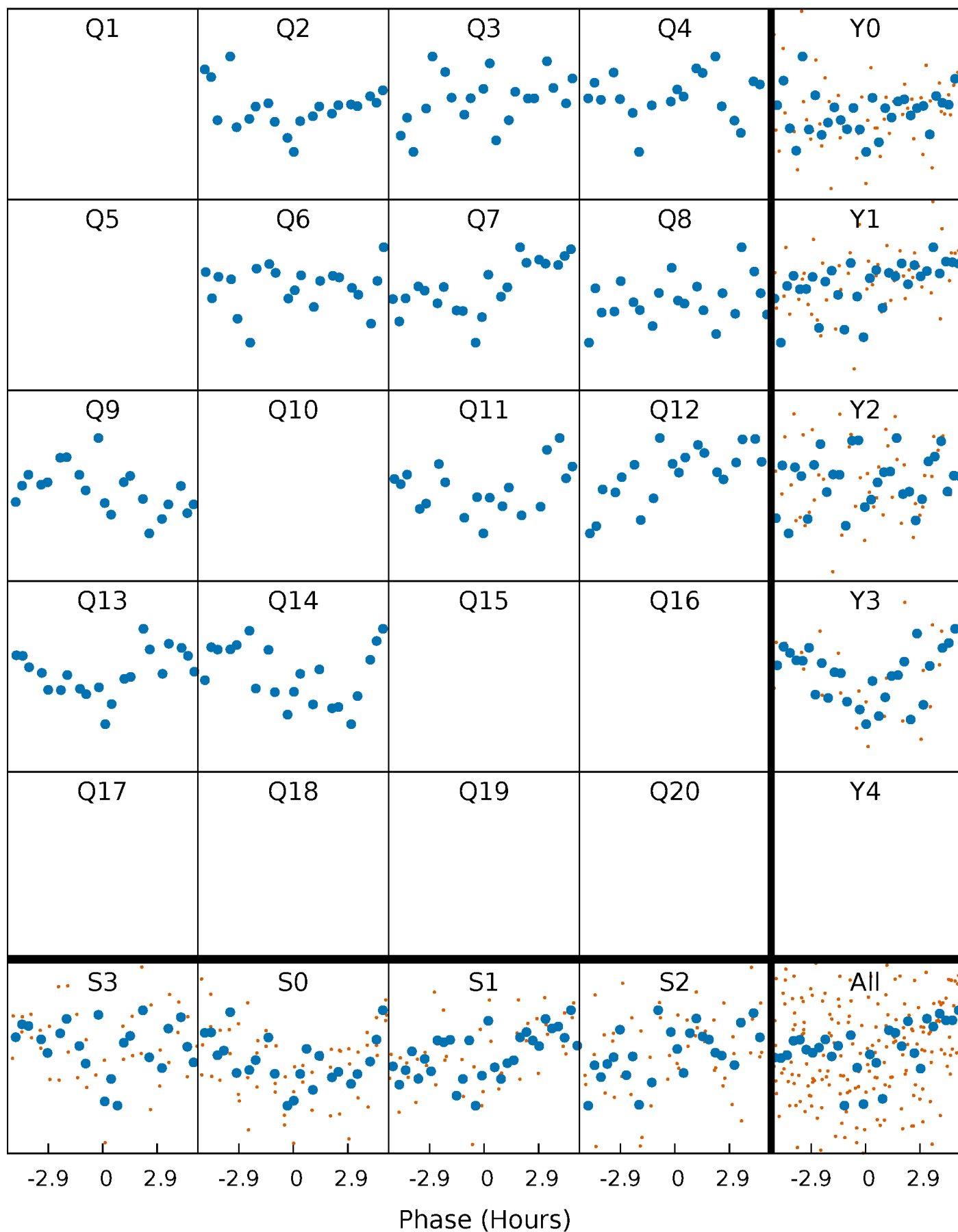


Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



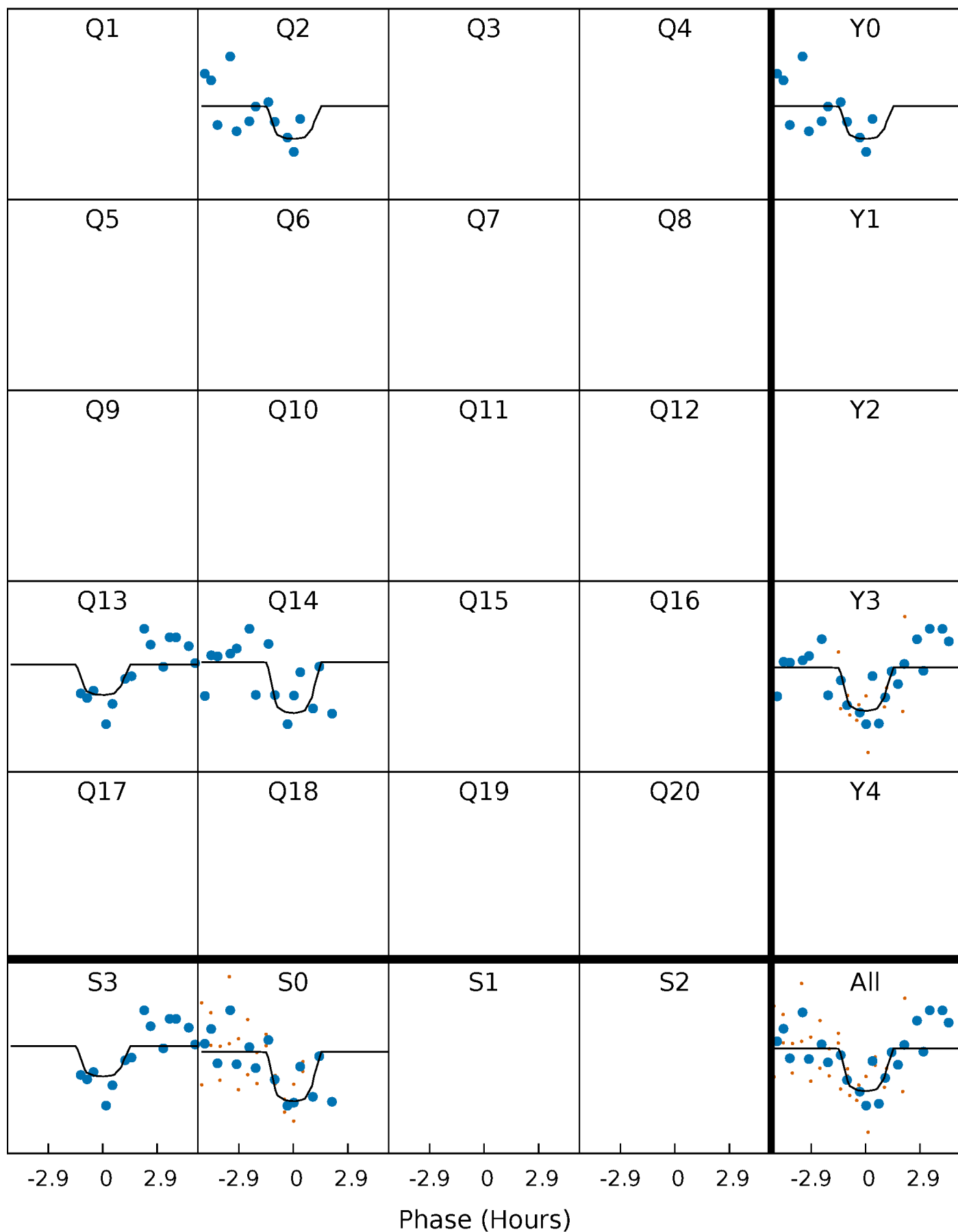
PDC Quarter-Phased Transit Curves

TCE 009405865-06 P=115.844151 Days $T_0=210.325697$ (BKJD)



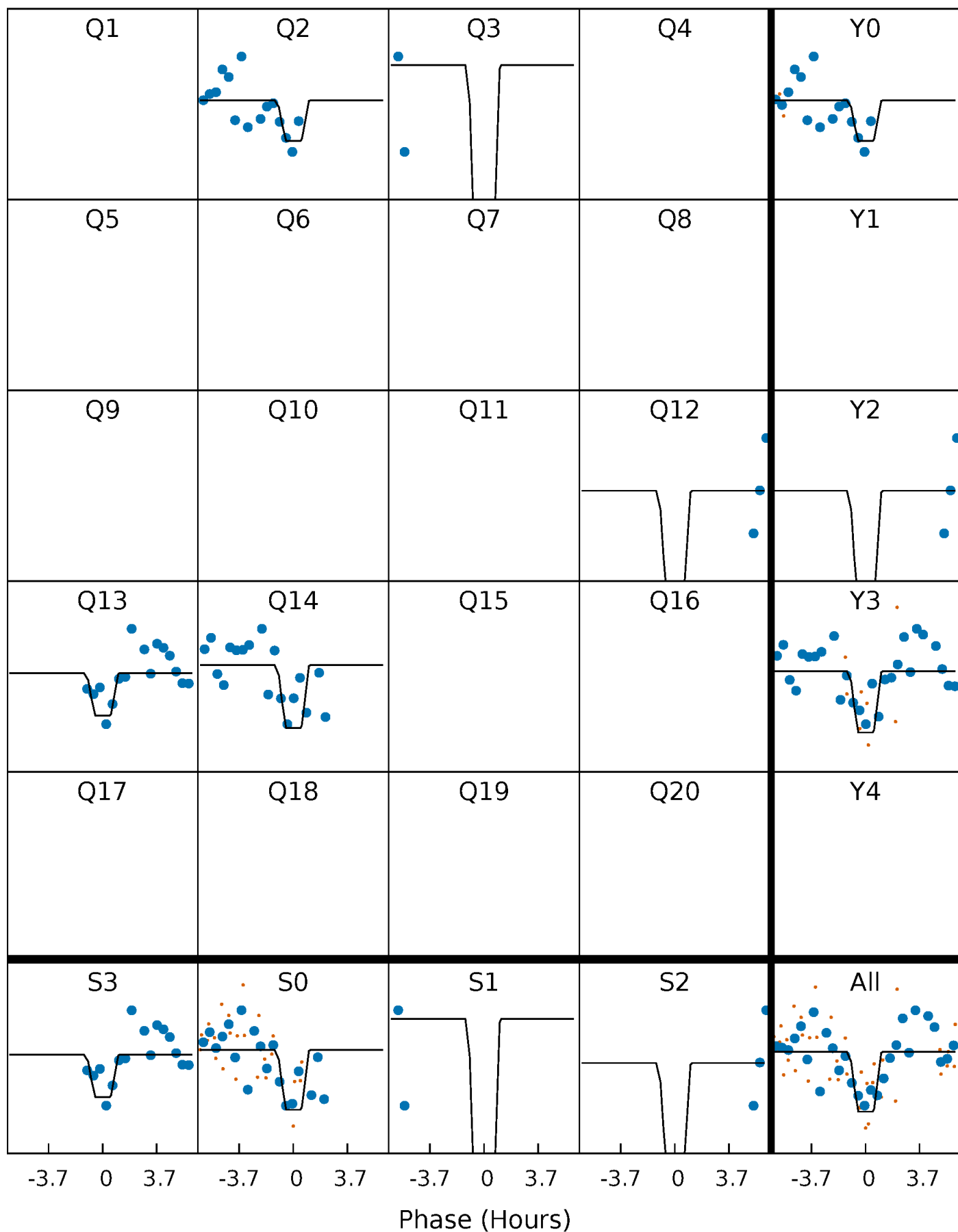
DV Quarter-Phased Transit Curves

TCE 009405865-06 P=115.844151 Days $T_0=210.325697$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

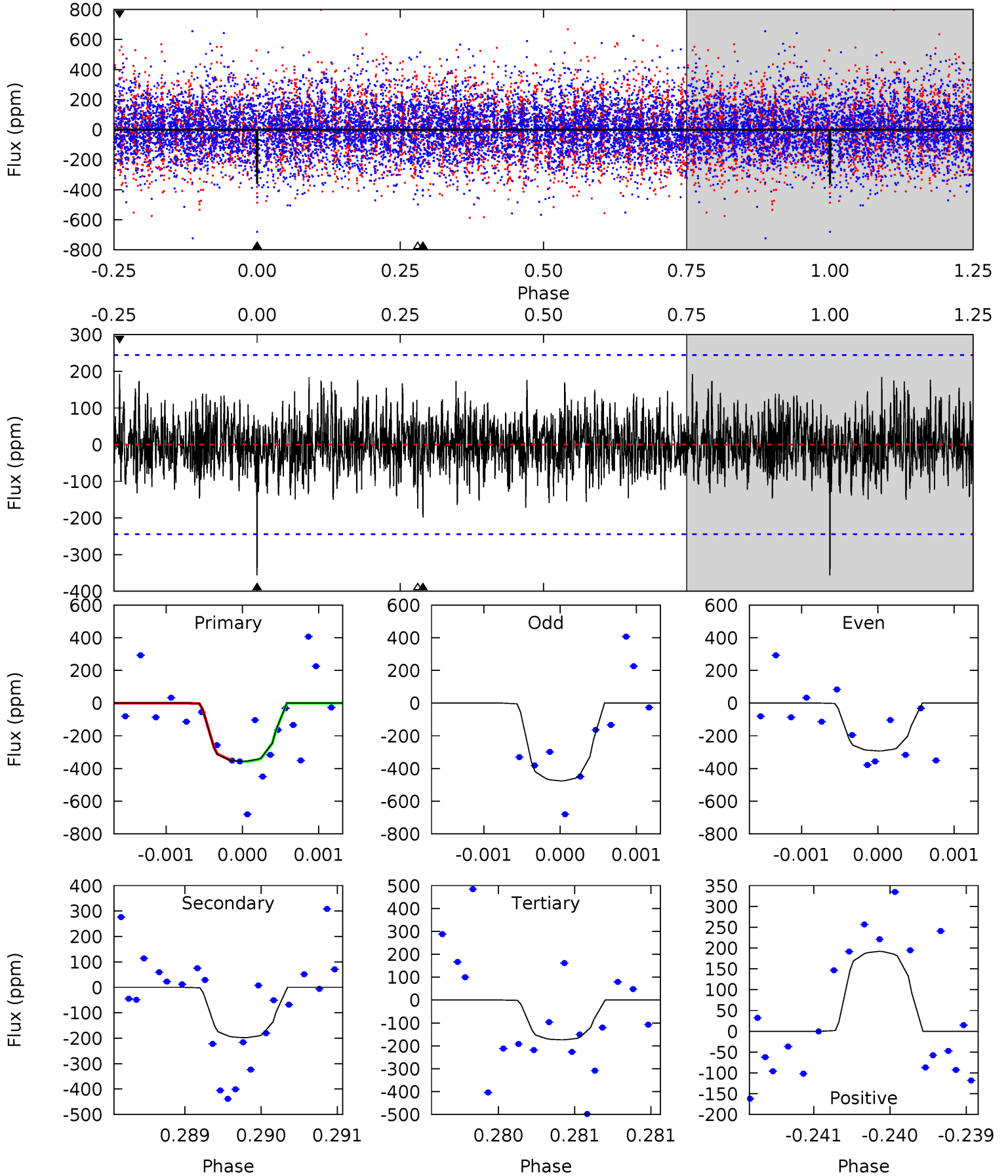
TCE 009405865-06 P=115.843781 Days $T_0=210.326511$ (BKJD)



DV Model-Shift Uniqueness Test

009405865-06, P = 115.844151 Days, E = 94.481546 Days

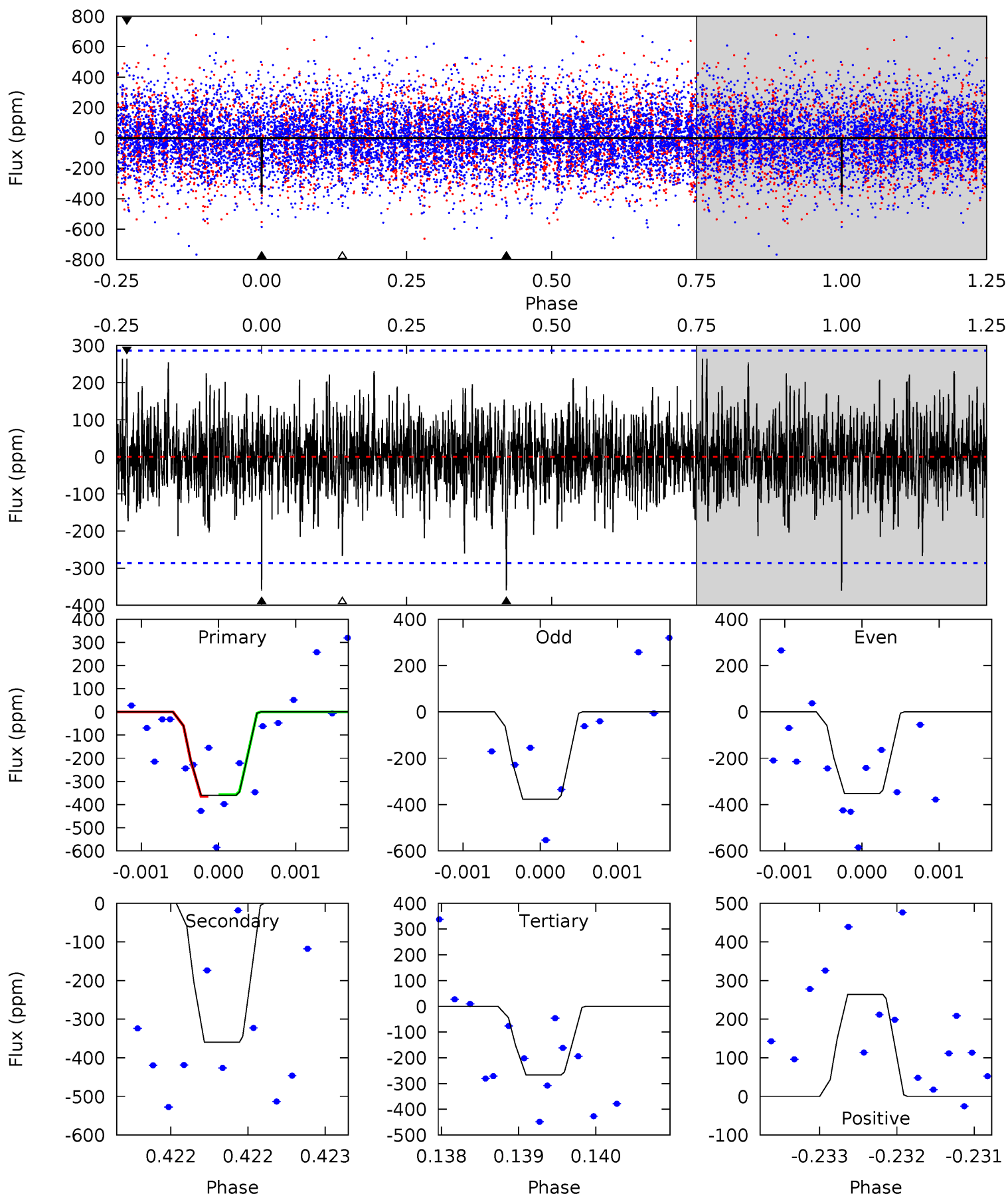
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.96	4.43	3.89	4.29	5.47	3.31	1.25	4.07	3.67	0.54	0.14	1.97	1.15	0.35	0.12



Alt Model-Shift Uniqueness Test

009405865-06, P = 115.843781 Days, E = 94.482730 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.92	6.91	5.12	5.08	5.50	3.36	1.34	1.80	1.84	1.79	1.83	0.22	0.96	0.42	0.07



Stellar Parameters For KIC 009405865

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7193^{+200}_{-300}	$4.188^{+0.128}_{-0.192}$	$-0.200^{+0.250}_{-0.350}$	$1.580^{+0.501}_{-0.308}$	$1.409^{+0.218}_{-0.218}$	$0.503^{+0.323}_{-0.267}$
	+3%/-4%	+3%/-5%	+125%/-175%	+32%/-19%	+15%/-15%	+64%/-53%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009405865-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-198 ± 45	$4.19^{+2.88}_{-2.46}$	776^{+59}_{-51}	5526^{+3710}_{-1166}	1693^{+8189}_{-1160}
Alt.	-359 ± 52	$4.14^{+3.24}_{-2.54}$	773^{+61}_{-48}	6277^{+4985}_{-1405}	3009^{+16353}_{-2032}

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

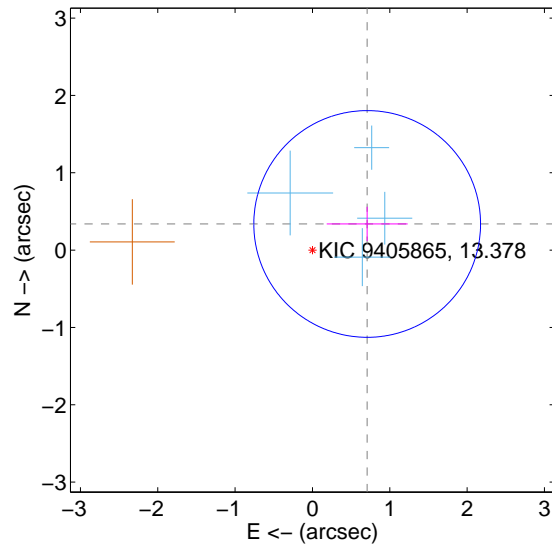
Supplemental centroid analysis for 009405865-06. Kepler magnitude: 13.38. Transit SNR 8.00

There are 4 quarters with good PRF difference image offsets

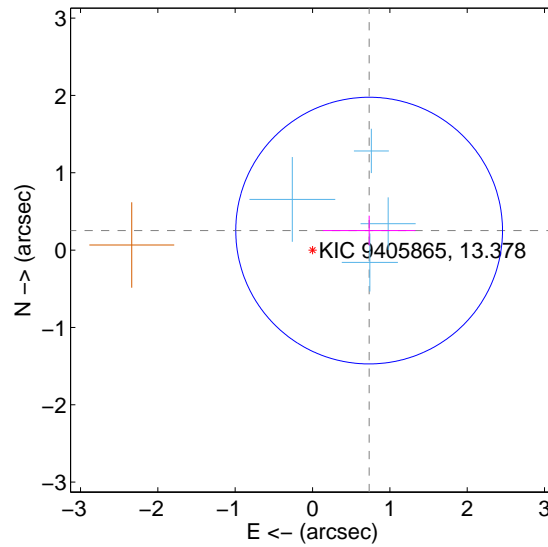
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.784 ± 0.489	1.61	-0.708 ± 0.524	0.338 ± 0.222
PRF-fit source offset from KIC position	0.774 ± 0.575	1.35	-0.732 ± 0.599	0.252 ± 0.192
photometric centroid source offset	0.25 ± 0.78	0.32	0.12 ± 0.79	0.22 ± 0.78

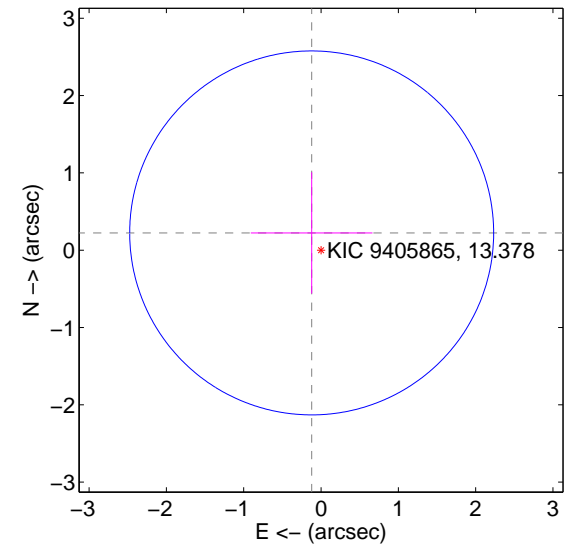
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids



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

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

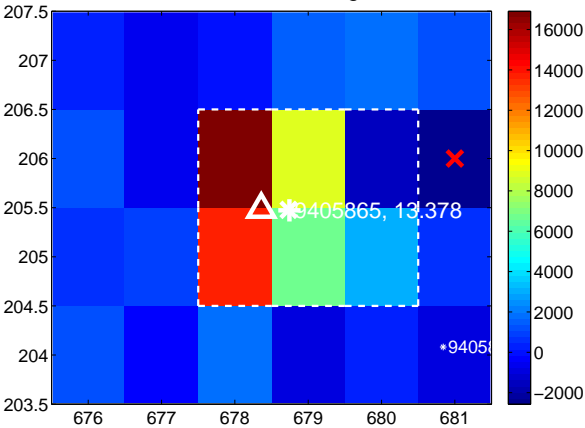
Q1 no difference image



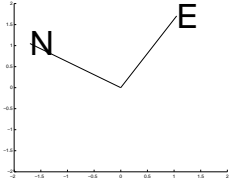
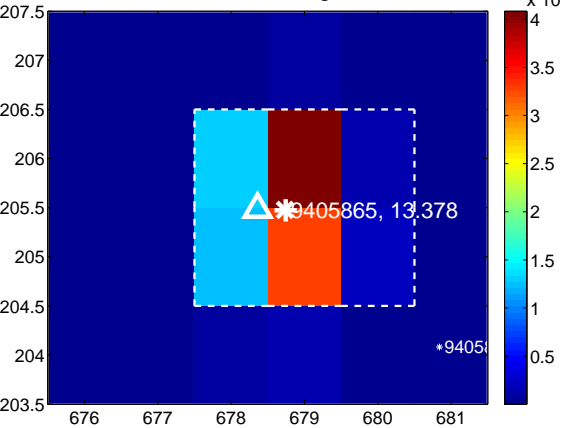
Q1 no OOT image



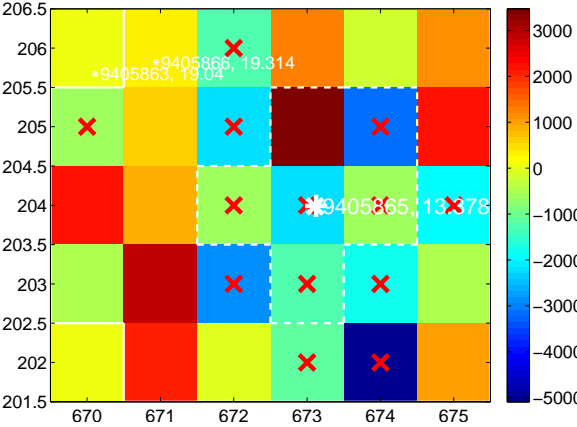
Q2 difference image



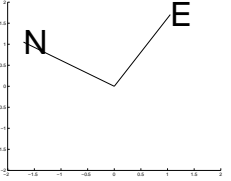
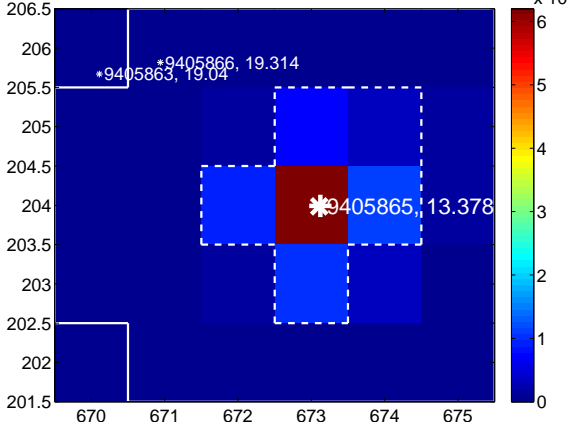
Q2 OOT image



Q3 difference image. Poor Quality



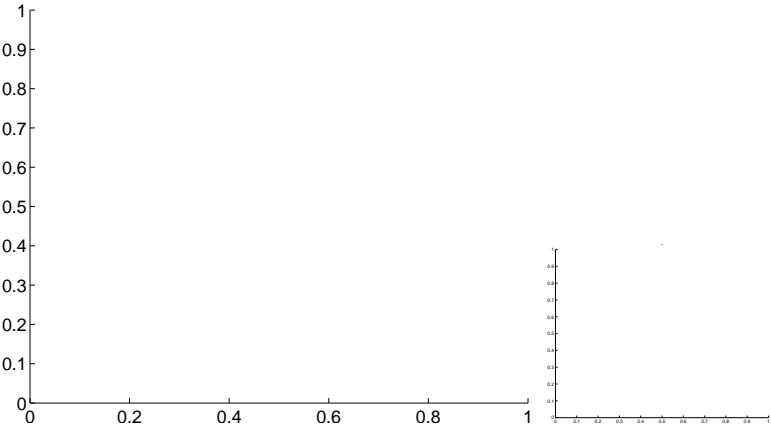
Q3 OOT image



Q4 no difference image



Q4 no OOT image

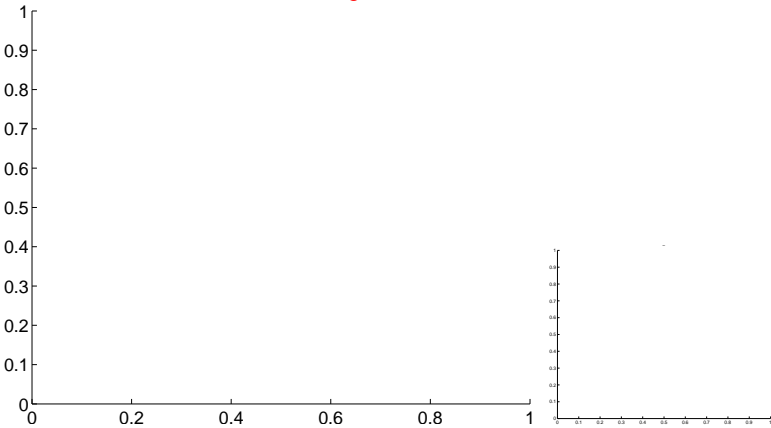


white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

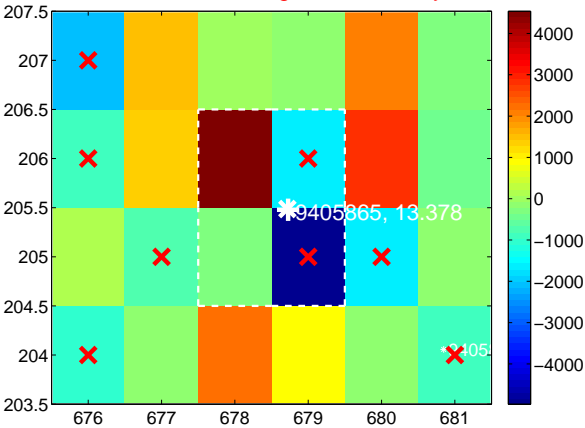
Q5 no difference image



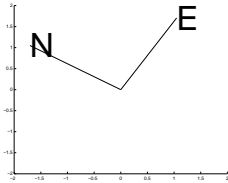
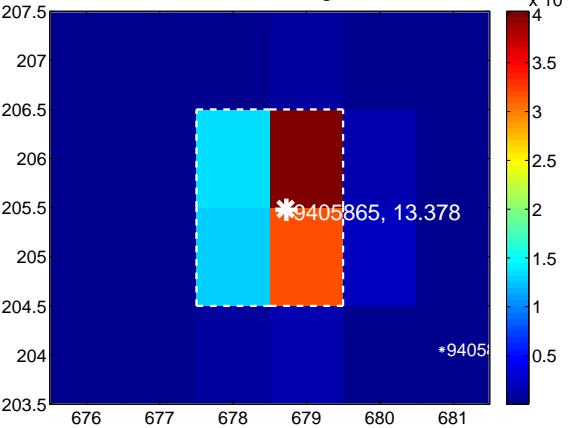
Q5 no OOT image



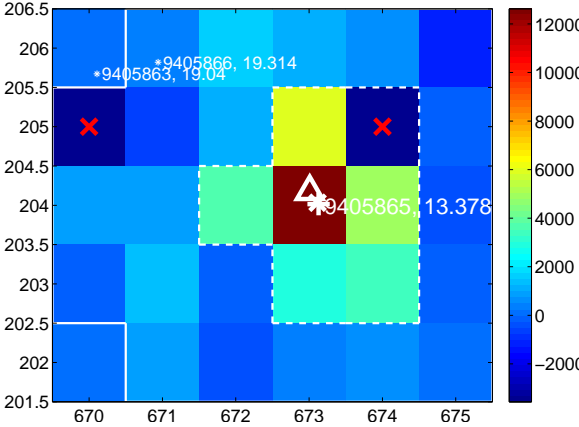
Q6 difference image. Poor Quality



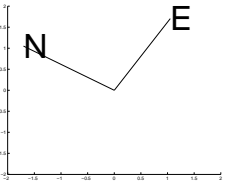
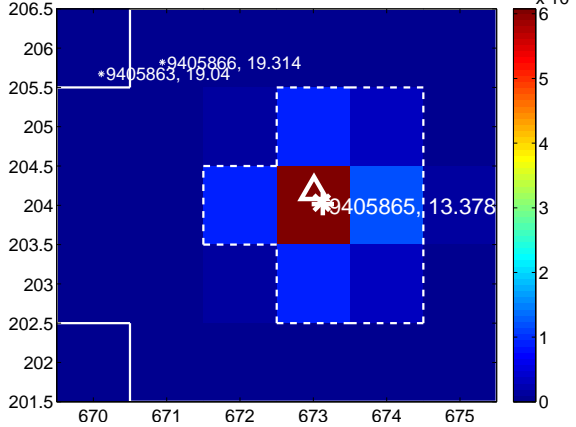
Q6 OOT image



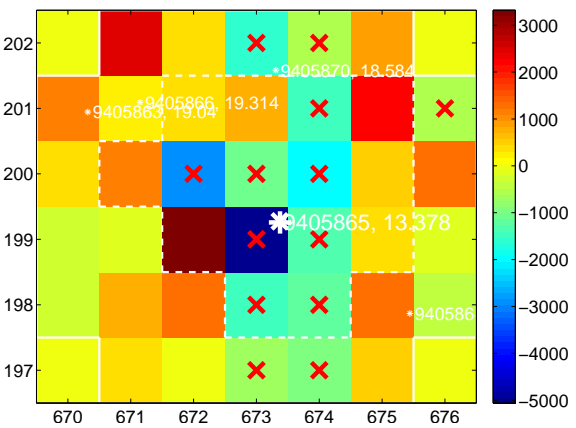
Q7 difference image



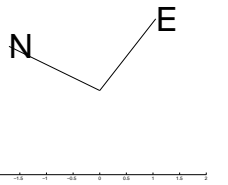
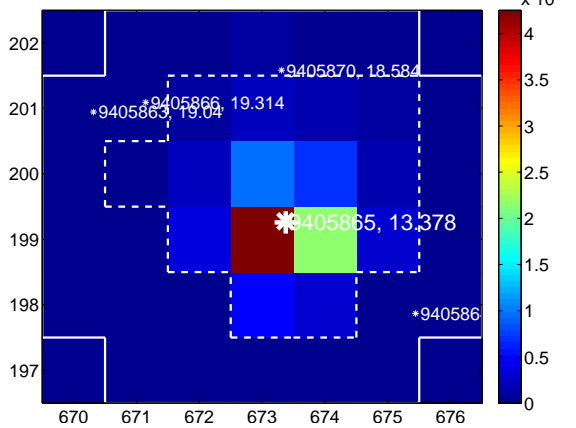
Q7 OOT image



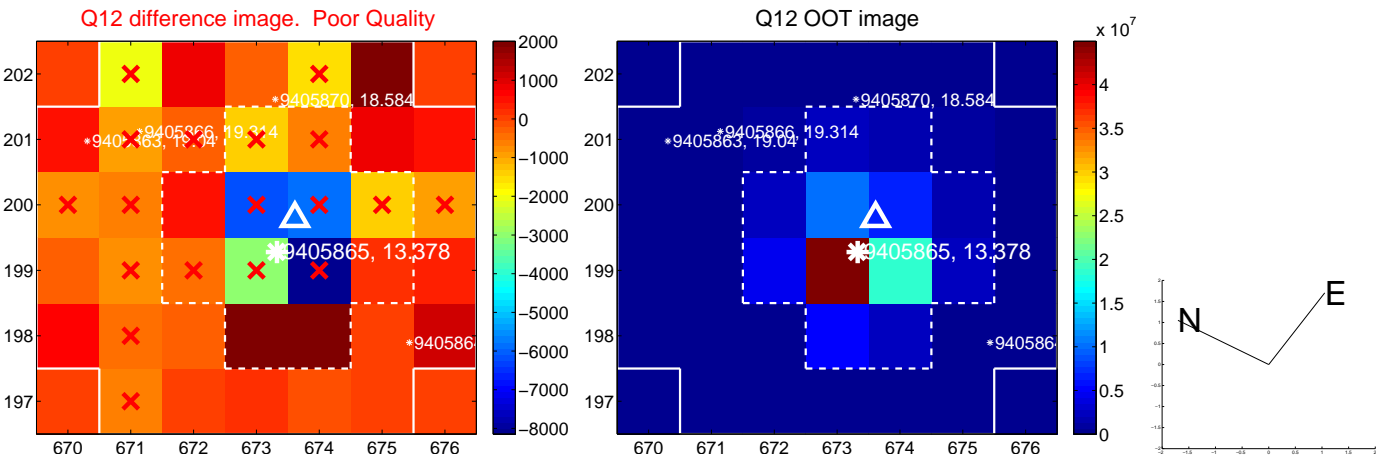
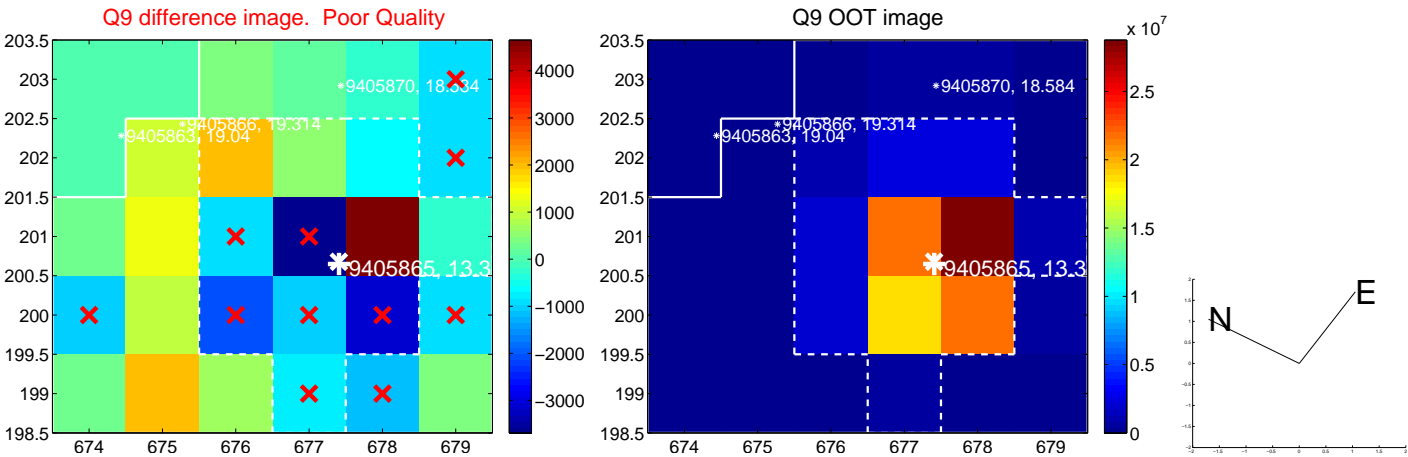
Q8 difference image. Poor Quality



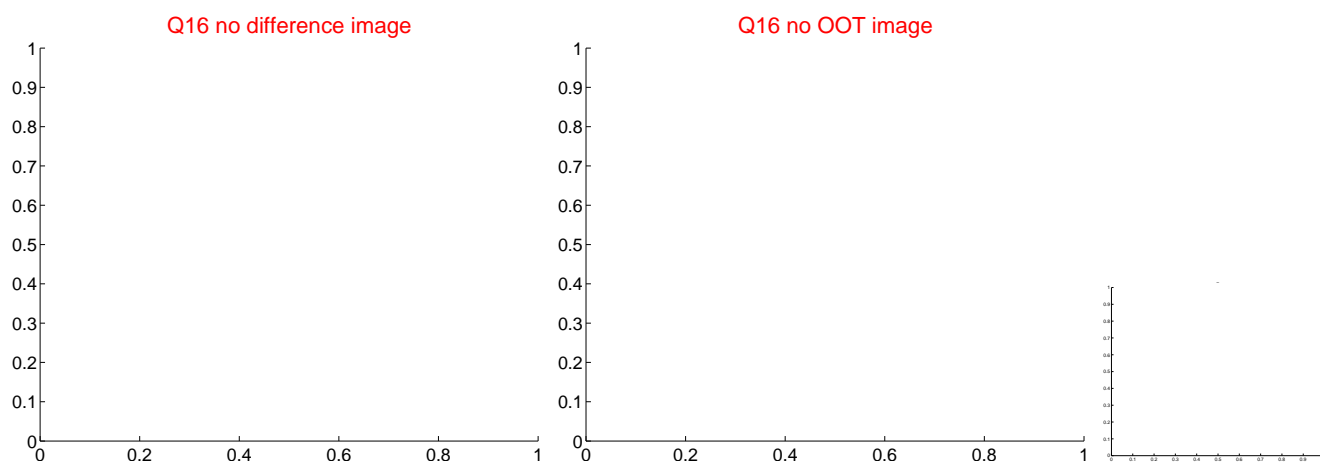
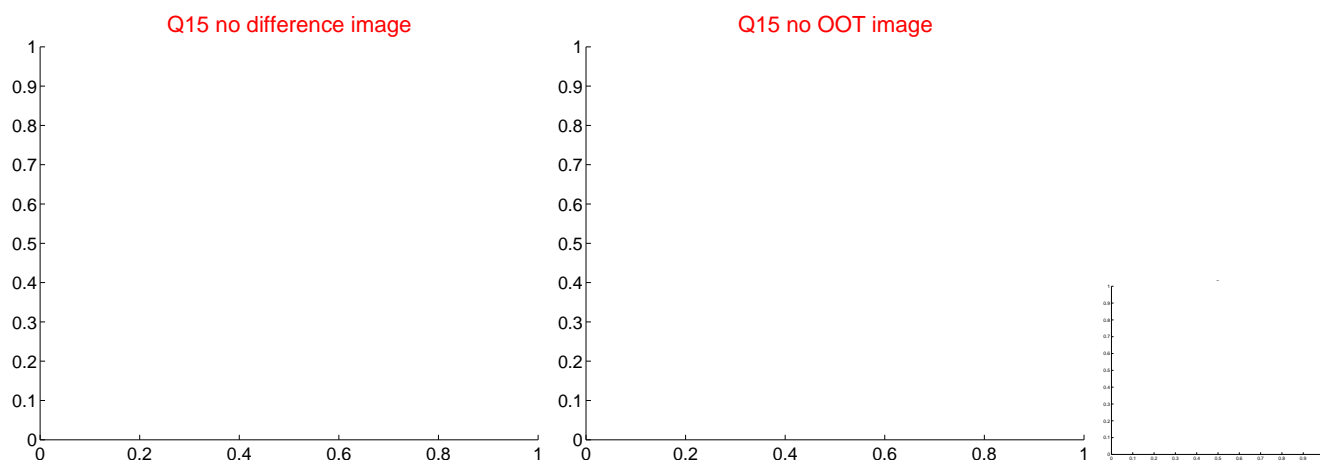
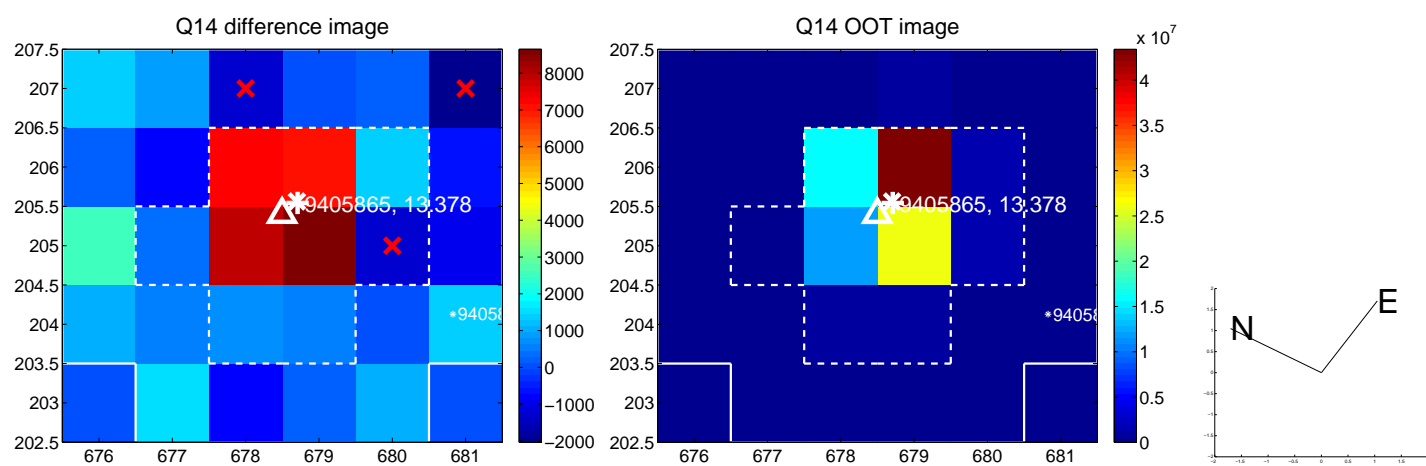
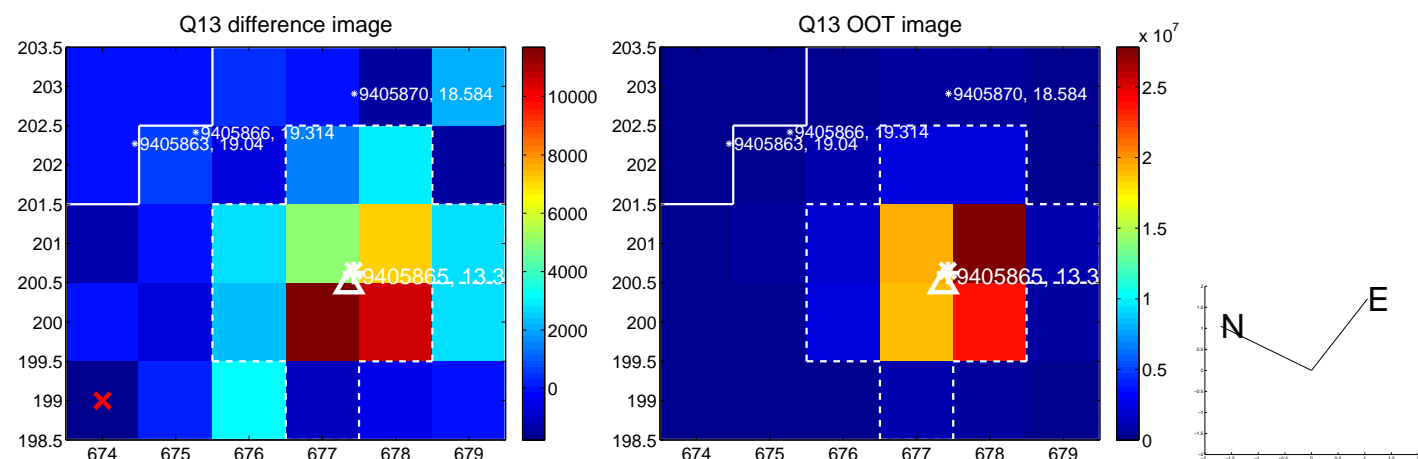
Q8 OOT image



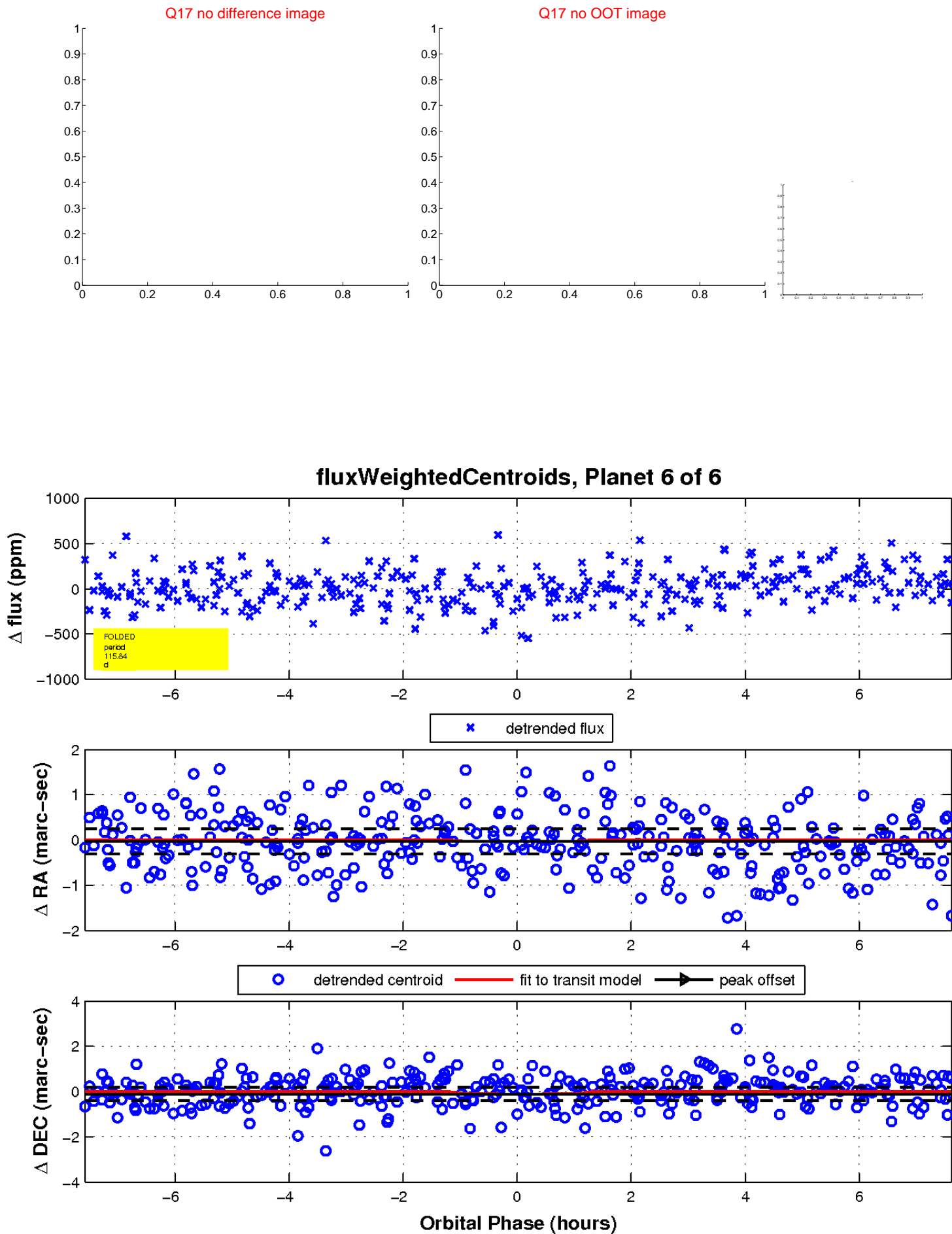
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image

Declination

