

KIC 007109598

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})
007109598-01	OBS	No	0.685040	131.592712	72.6	4.622	13.9	11.1	2.30	7182	1.99	36313.93
007109598-02	OBS	No	44.596854	134.718716	2015.5	1.095	19.5	14.0	2.30	7182	10.53	138.66
007109598-03	OBS	No	17.131766	142.054228	474.4	7.117	14.4	14.0	2.30	7182	5.10	496.55
007109598-04	OBS	No	8.563904	137.688683	656.3	1.261	13.0	15.3	2.30	7182	6.95	1251.60

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007109598-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_SATURATED
007109598-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED—HALO_GHOST
007109598-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_SATURATED
007109598-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

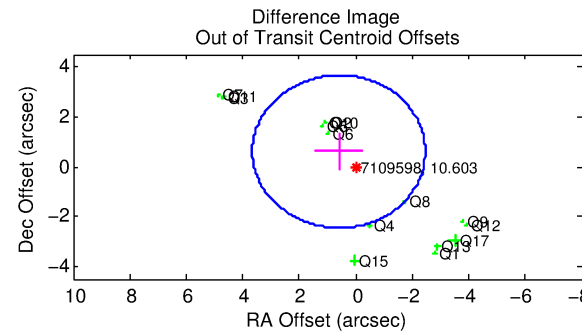
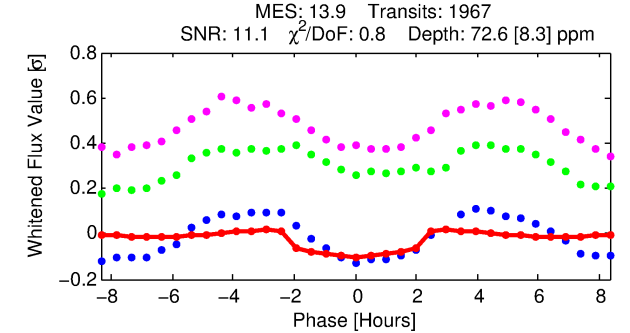
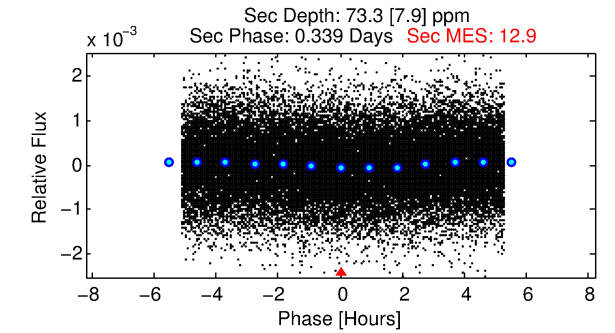
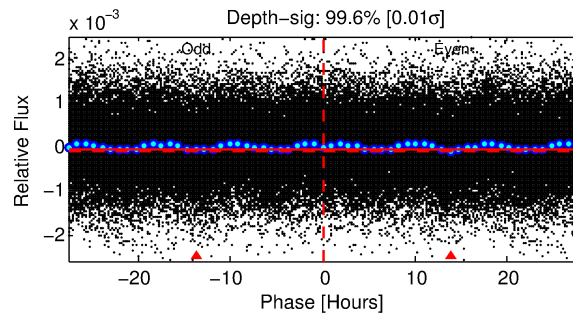
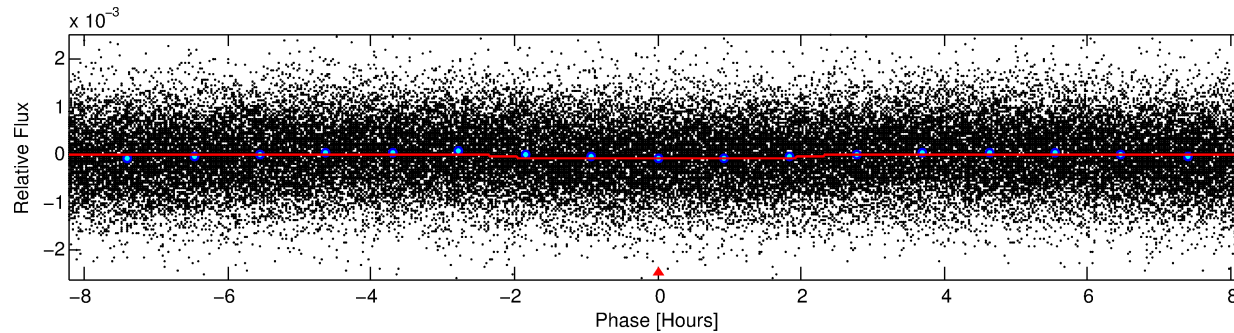
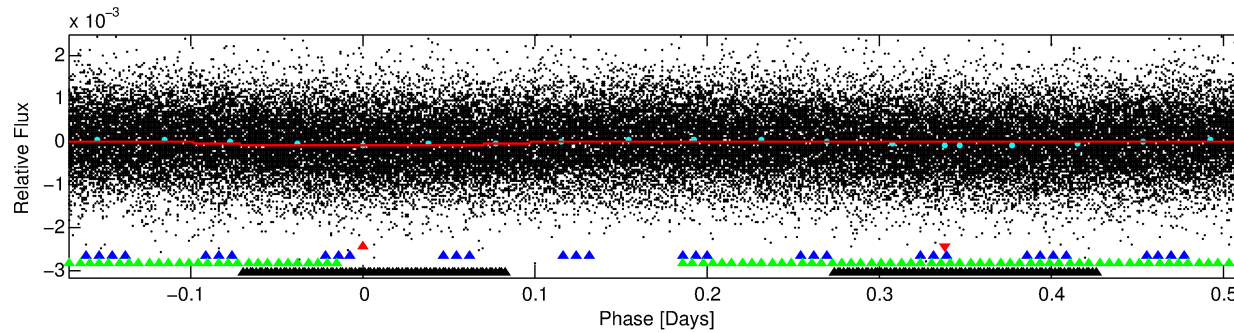
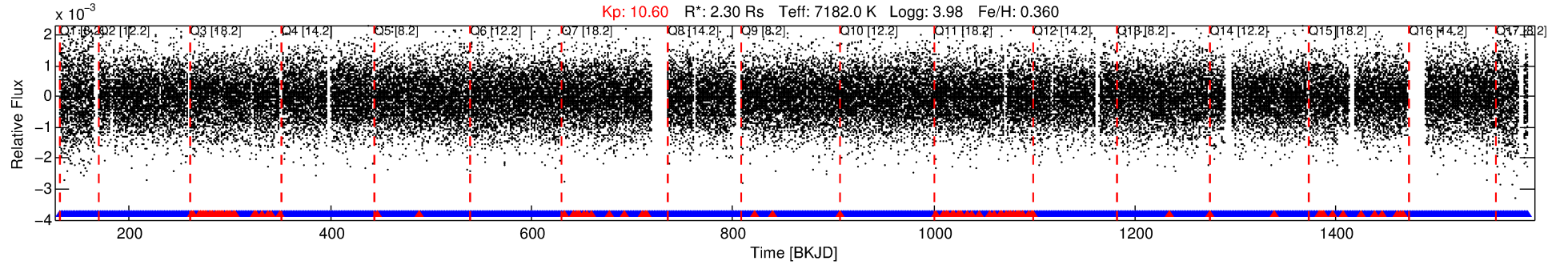
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007109598-01

No Significant Match Found

DV One-Page Summary

KIC: 7109598 Candidate: 1 of 4 Period: 0.685 d



DV Fit Results:

Period = 0.68504 [0.00001] d
Epoch = 131.5927 [0.0036] BKJD
 R_p/R^* = 0.0079 [0.0069]
 a/R^* = 1.30 [2.65]
 b = 0.16 [30.96]
 Seff = 36313.93 [8002.31]
 Teq = 3520 [194] K
 R_p = 1.99 [1.76] R_e
 a = 0.0186 [0.0026] AU
 Ag = 3.55 [6.24] [0.41 σ]
 Teffp = 7470 [3263] K [1.21 σ]

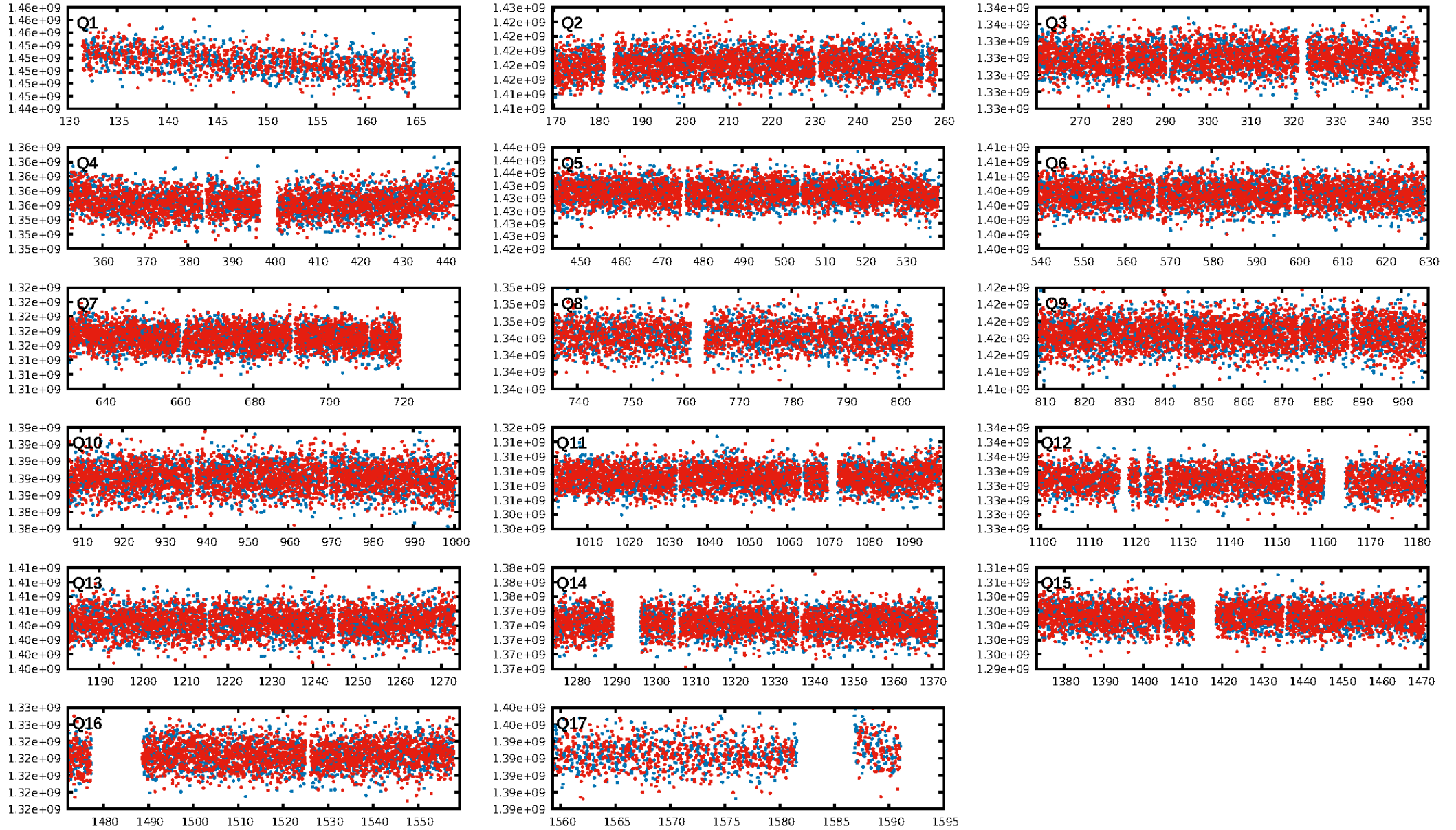
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [39.47 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.44e-21
RollingBand-fgt: 0.95 [1780/1879]
GhostDiagnostic-chr: 2.936
Centroid-sig: 0.0%
Centroid-so: 0.641 arcsec [2.71 σ]
OotOffset-rm: 0.850 arcsec [0.83 σ]
KicOffset-rm: 1.993 arcsec [2.03 σ]
OotOffset-st: 3/4/3/5 [15]
KicOffset-st: 3/4/3/5 [15]
DiffImageQuality-fgm: 0.53 [8/15]
DiffImageOverlap-fno: 1.00 [17/17]

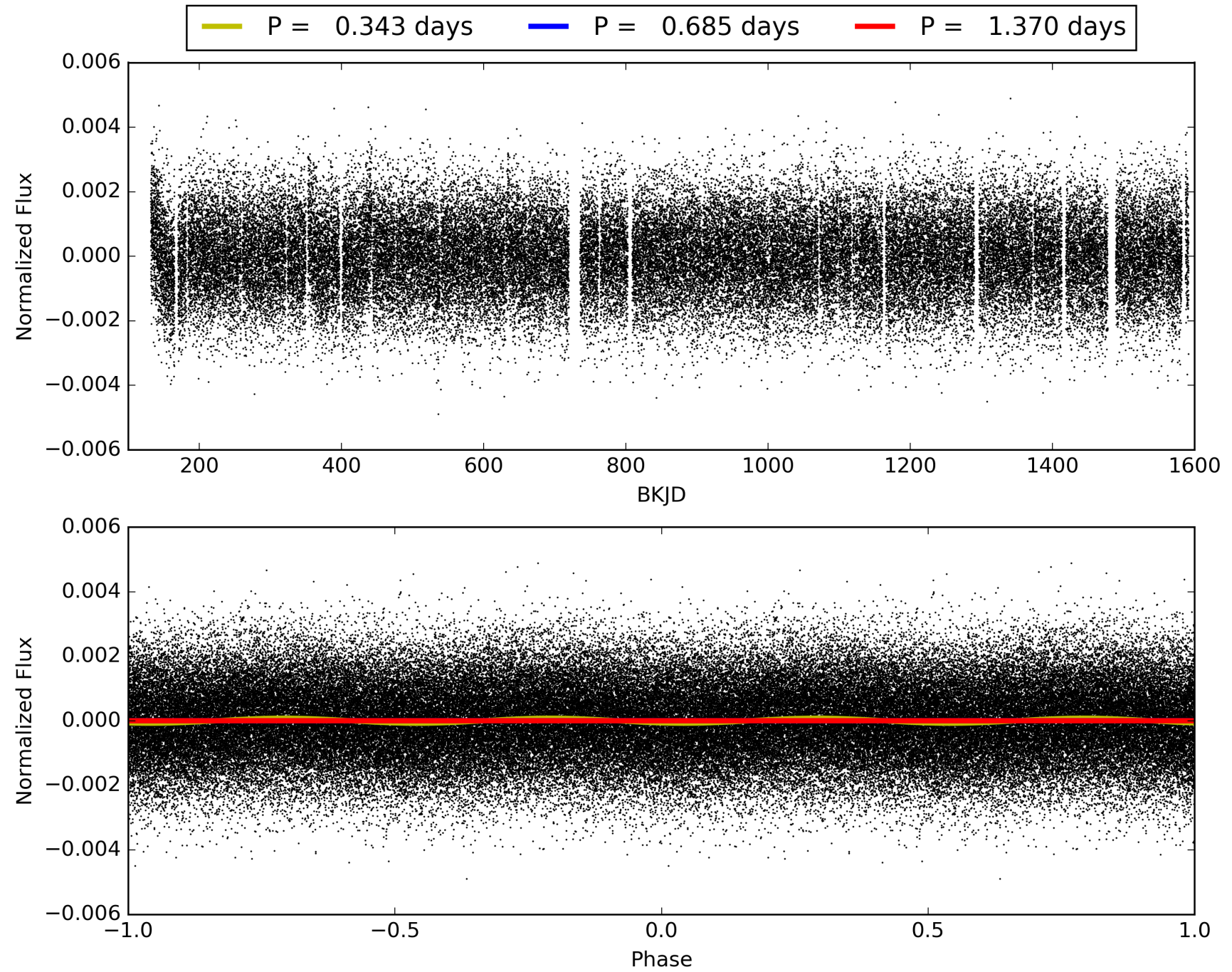
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:36:42 Z

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

TCE 007109598-01, PDC Light Curves

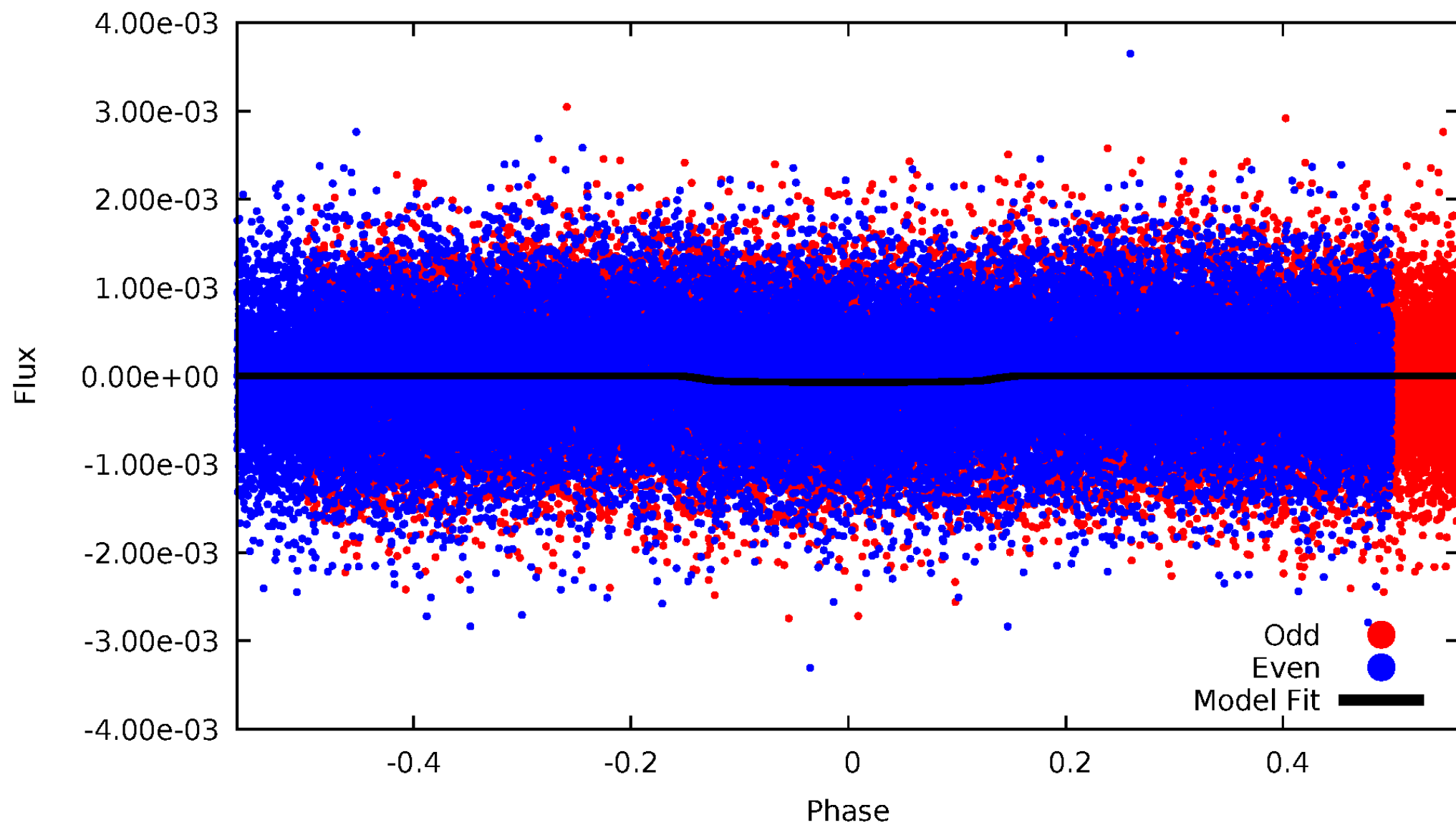


TCE 007109598-01



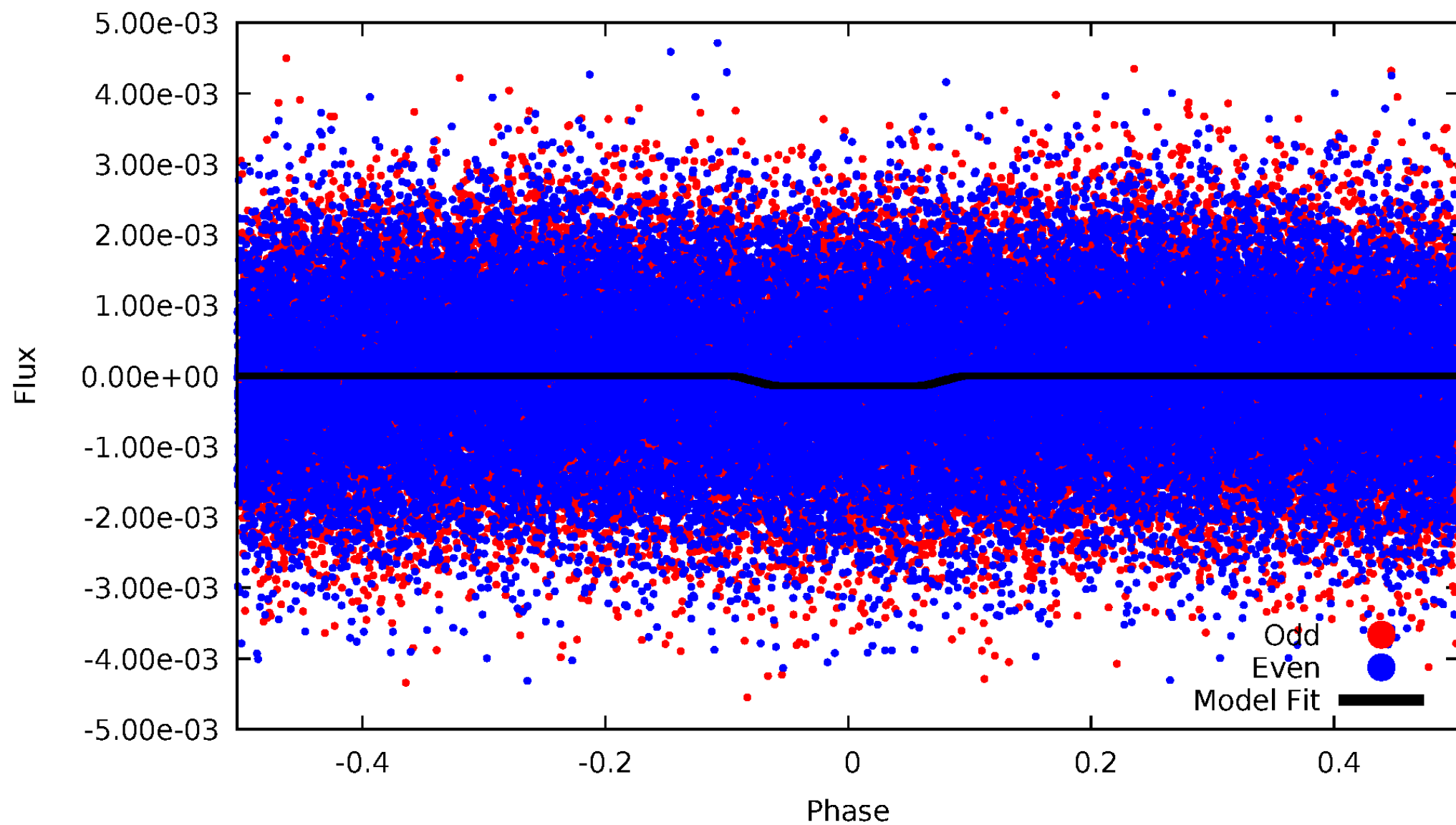
DV Odd/Even

TCE 007109598-01



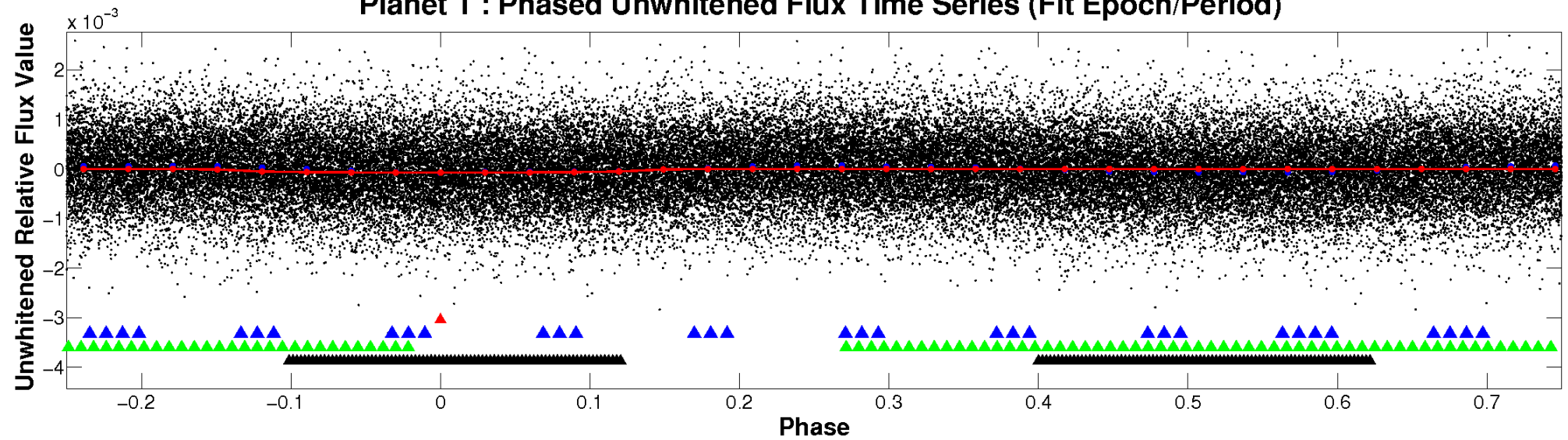
ALT Odd/Even

TCE 007109598-01

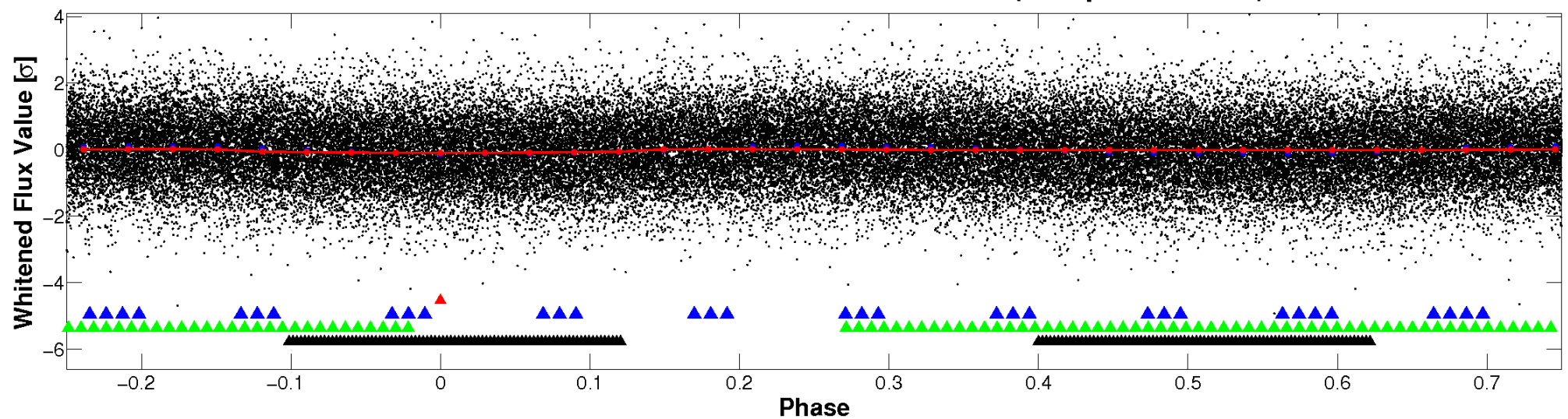


Non-Whitened Vs. Whitened Light Curve

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

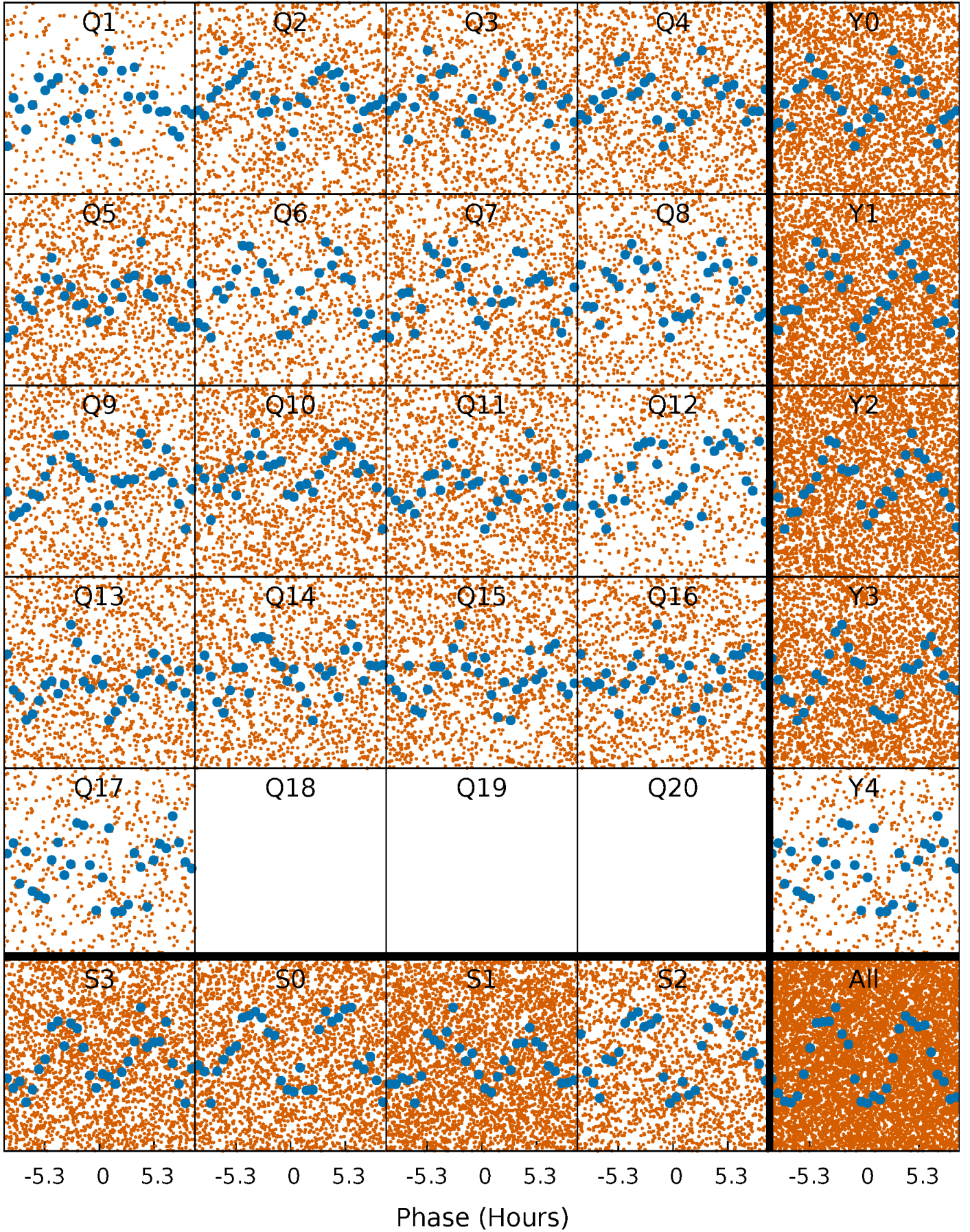


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



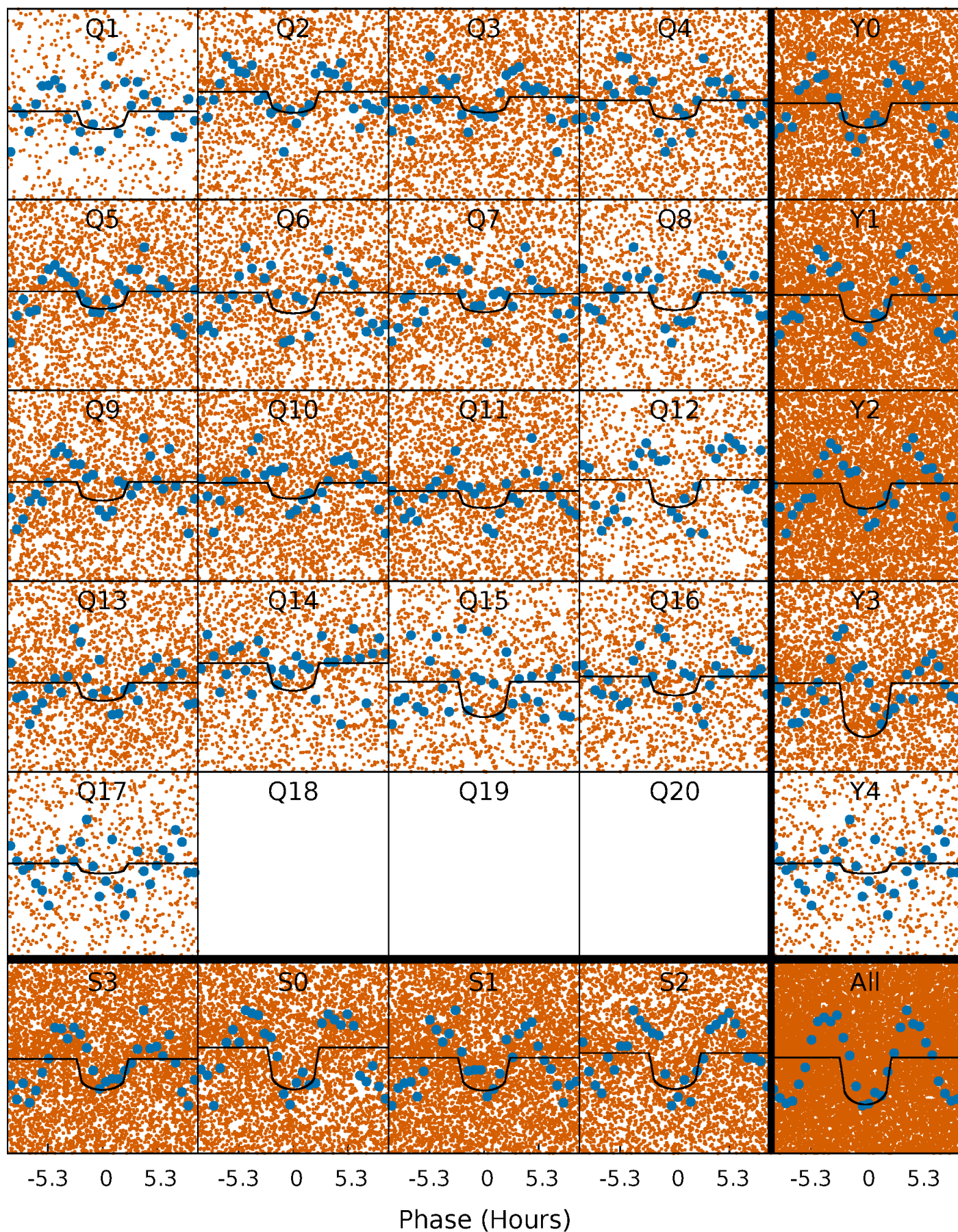
PDC Quarter-Phased Transit Curves

TCE 007109598-01 P= 0.685040 Days $T_0=131.592712$ (BKJD)



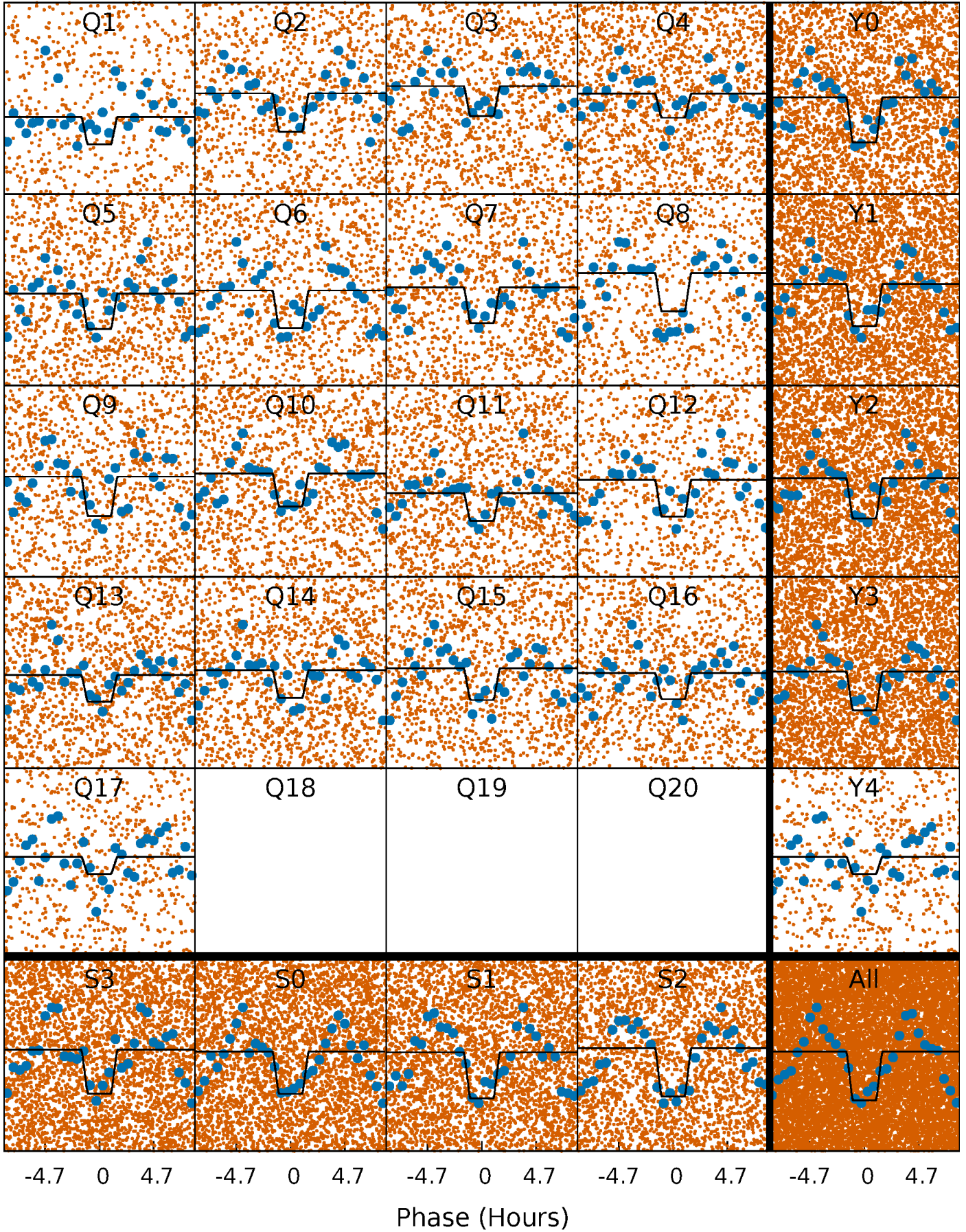
DV Quarter-Phased Transit Curves

TCE 007109598-01 P= 0.685040 Days $T_0=131.592712$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

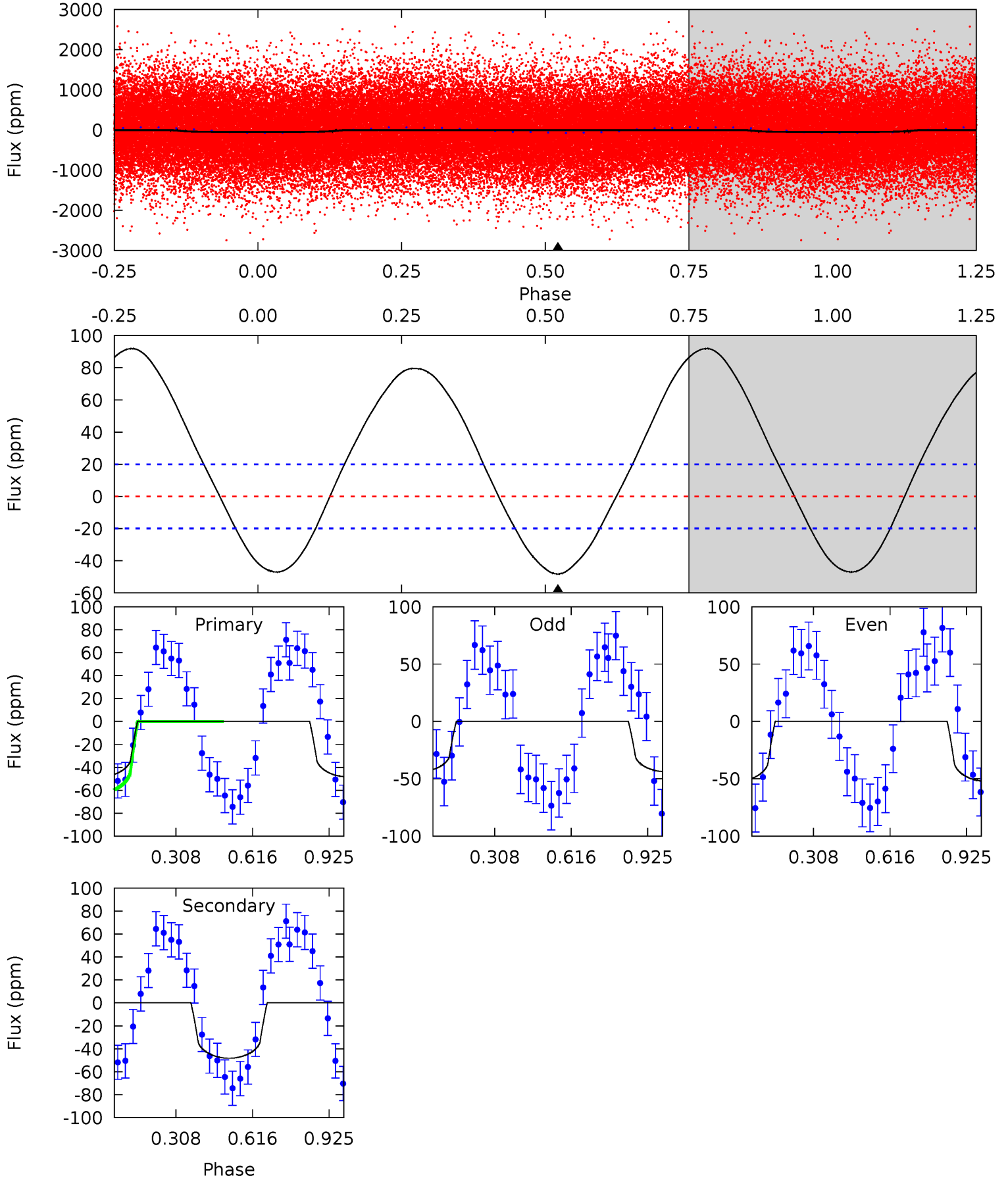
TCE 007109598-01 P= 0.685099 Days $T_0=131.557250$ (BKJD)



DV Model-Shift Uniqueness Test

007109598-01, P = 0.685040 Days, E = 130.907672 Days

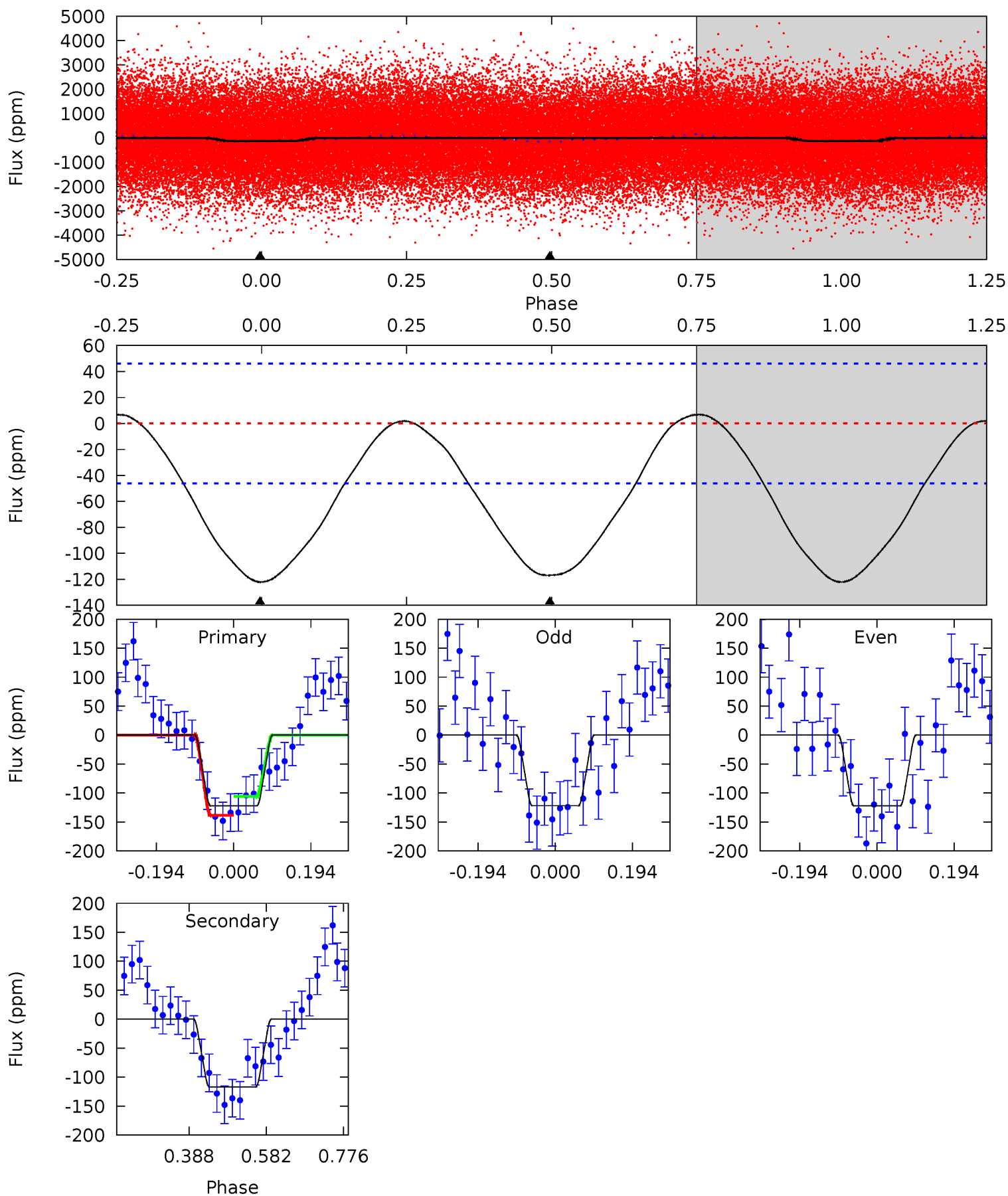
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.5	10.5	0	0	4.32	1.02	8.11	10.5	10.5	10.5	10.5	0.88	1.03	0.66	3.12



Alt Model-Shift Uniqueness Test

007109598-01, P = 0.685099 Days, E = 130.872151 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	11.2	0	0	4.42	1.30	0.53	11.7	11.7	11.2	11.2	0.02	1.00	0.05	1.58



Stellar Parameters For KIC 007109598

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7182^{+71}_{-93}	$3.979^{+0.121}_{-0.099}$	$0.360^{+0.050}_{-0.150}$	$2.300^{+0.368}_{-0.368}$	$1.838^{+0.116}_{-0.154}$	$0.213^{+0.122}_{-0.072}$
	+1%/-1%	+3%/-2%	+14%/-42%	+16%/-16%	+6%/-8%	+57%/-34%
Source	SPE68	SPE68	SPE68	DSEP		

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

Secondary Eclipse Parameters for KIC 007109598-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-48 ± 5	$2.10^{+1.72}_{-1.28}$	4888^{+211}_{-202}	6152^{+5431}_{-1852}	$2.050^{+11.144}_{-1.415}$
Alt.	-117 ± 10	$2.91^{+1.57}_{-1.48}$	4898^{+213}_{-209}	6658^{+4454}_{-1525}	$2.648^{+8.618}_{-1.568}$

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

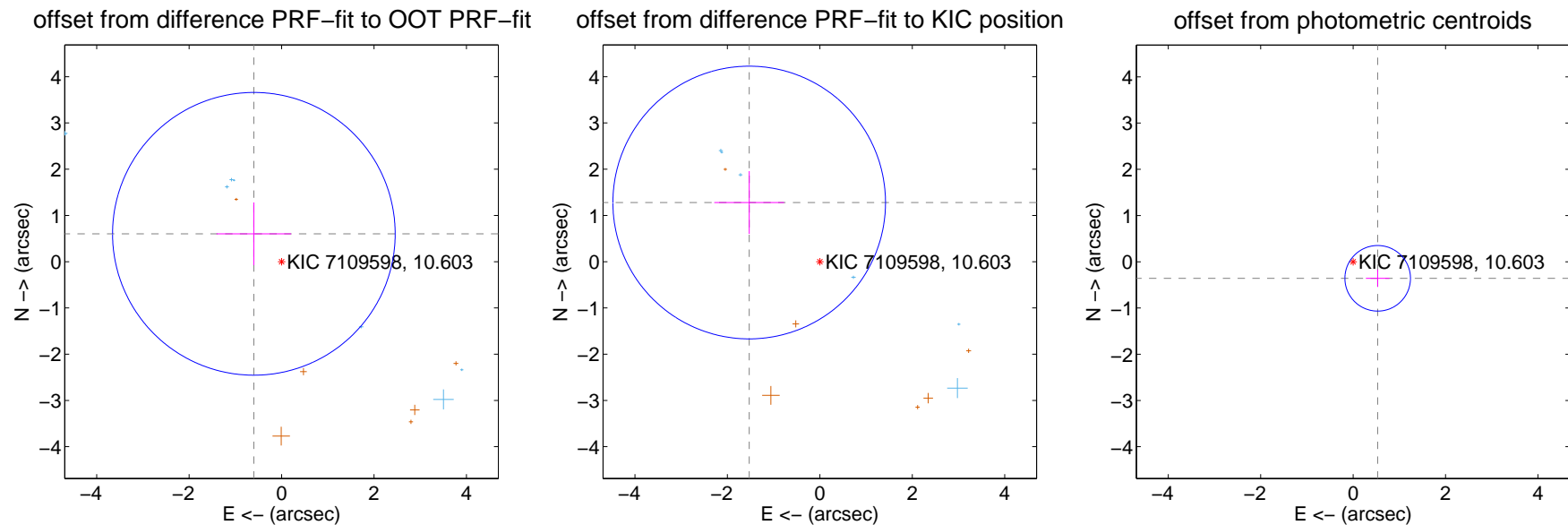
DV Centroid Data

Supplemental centroid analysis for 007109598-01. **Kepler magnitude: 10.60.** Transit SNR 11.15

There are 8 quarters with good PRF difference image offsets

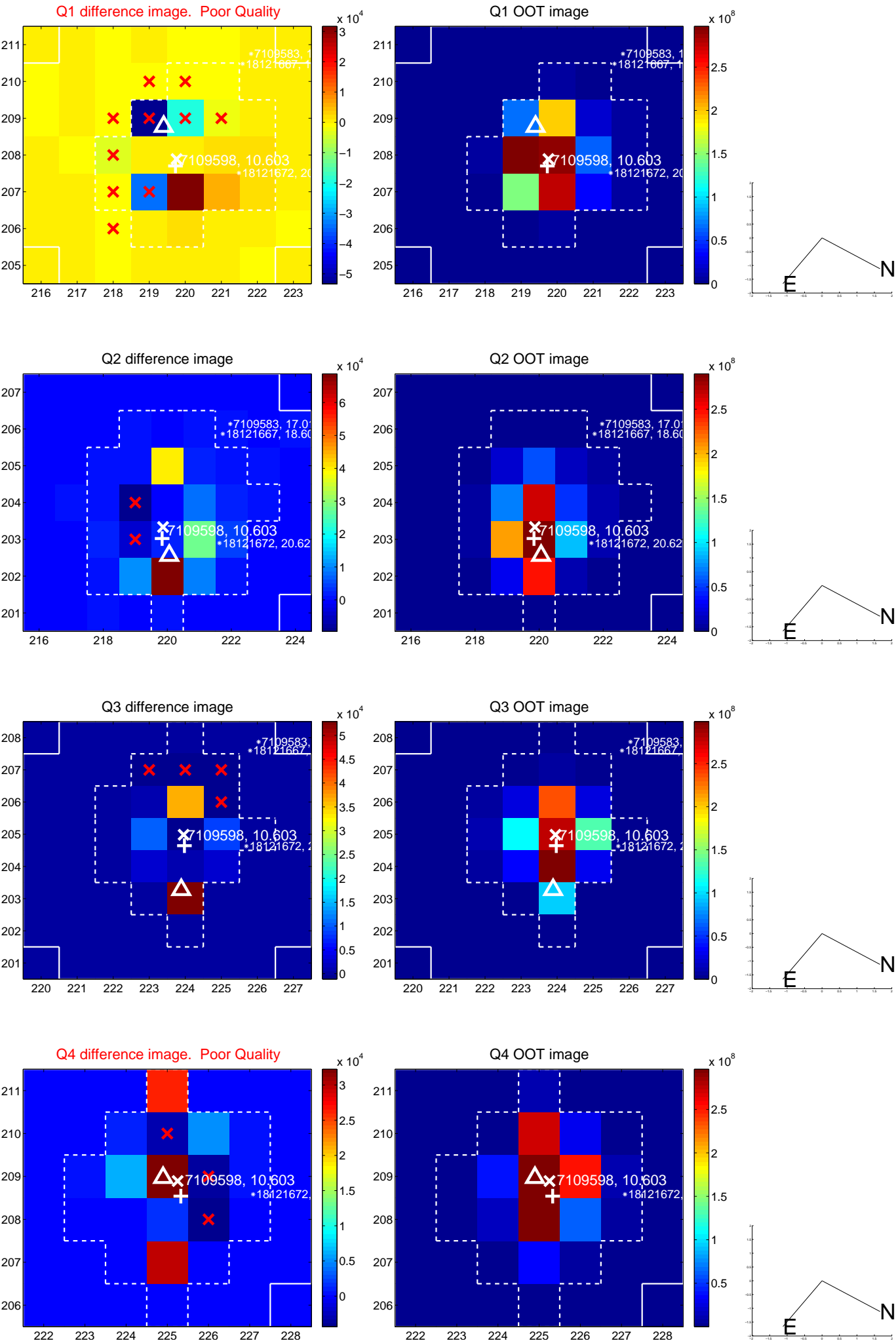
The direct PRF centroid is offset from the target star catalog position by about 0.58 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.850 ± 1.019	0.83	0.599 ± 0.808	0.603 ± 0.678
PRF-fit source offset from KIC position	1.993 ± 0.983	2.03	1.528 ± 0.756	1.279 ± 0.678
photometric centroid source offset	0.64 ± 0.24	2.71	-0.53 ± 0.26	-0.36 ± 0.19

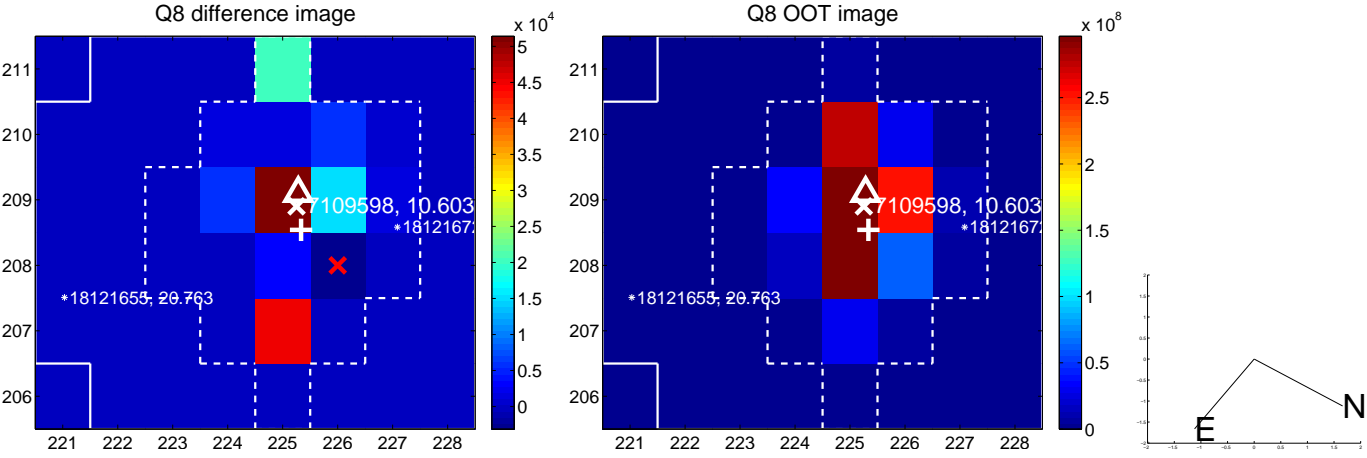
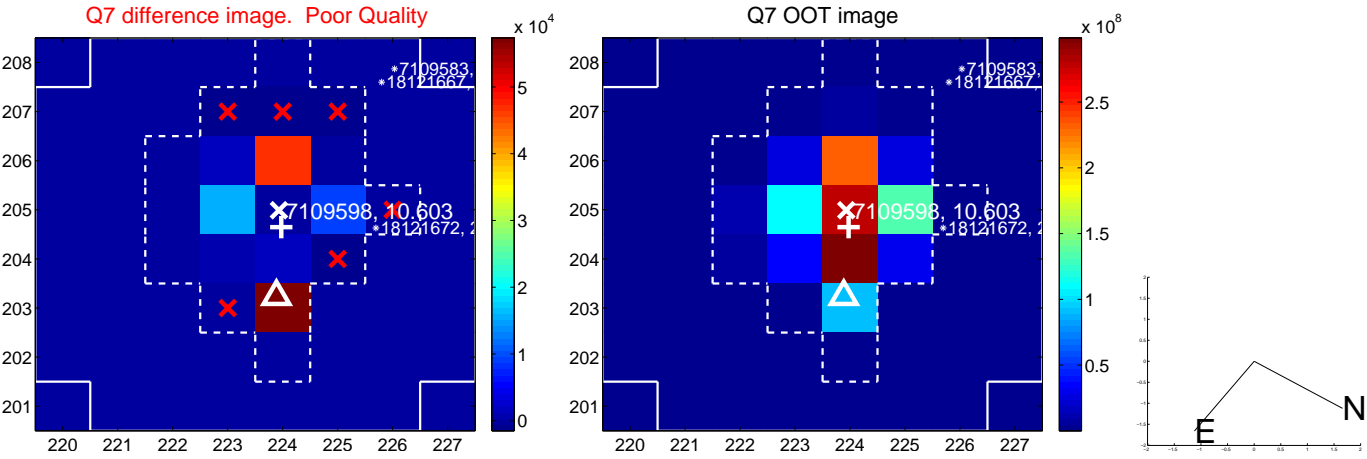
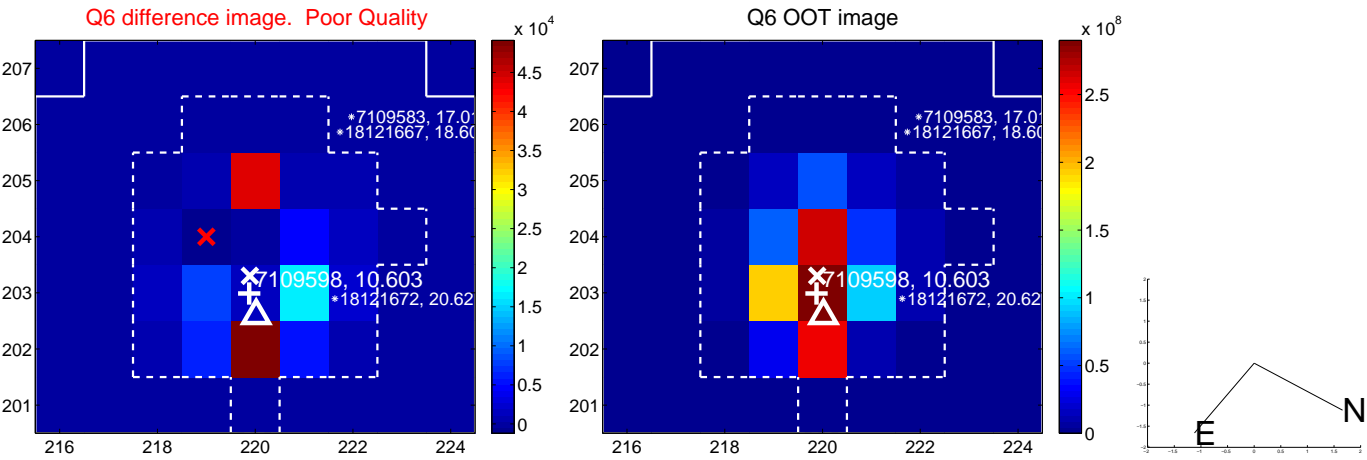
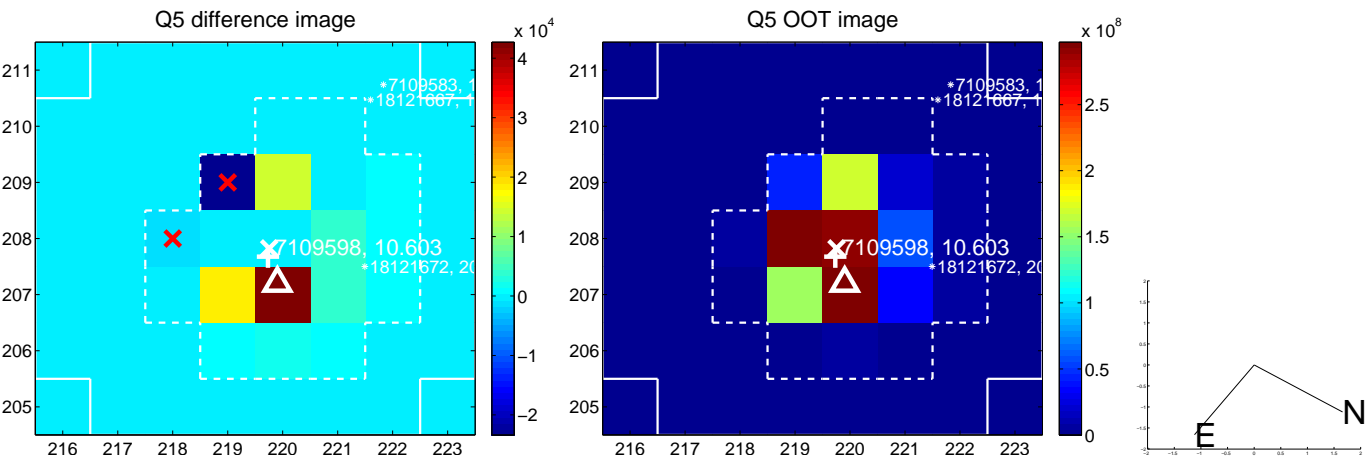


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

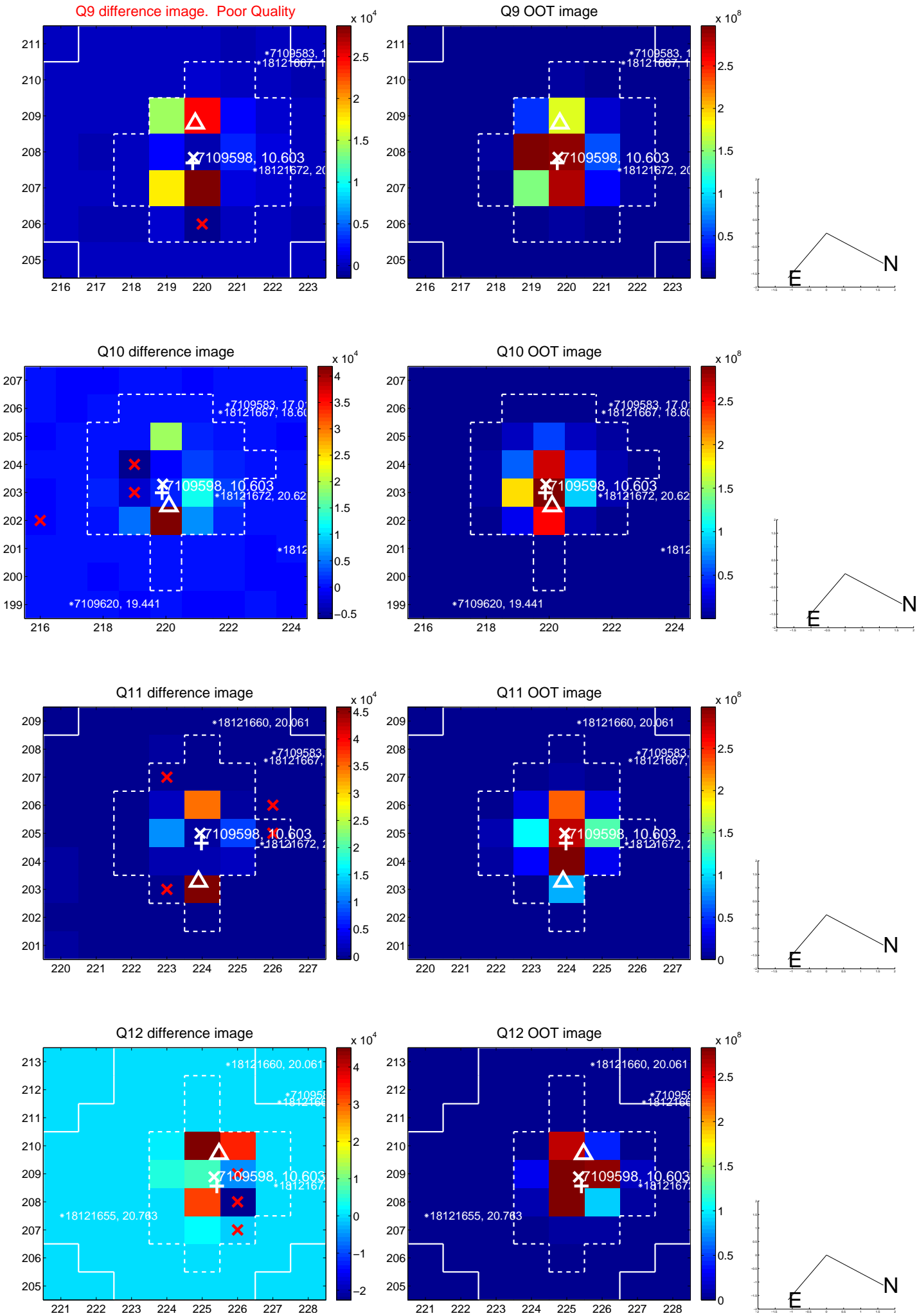
white \times : KIC target position; $+$: OOT centroid; Δ : difference centroid. red \times : large negative pixel value.



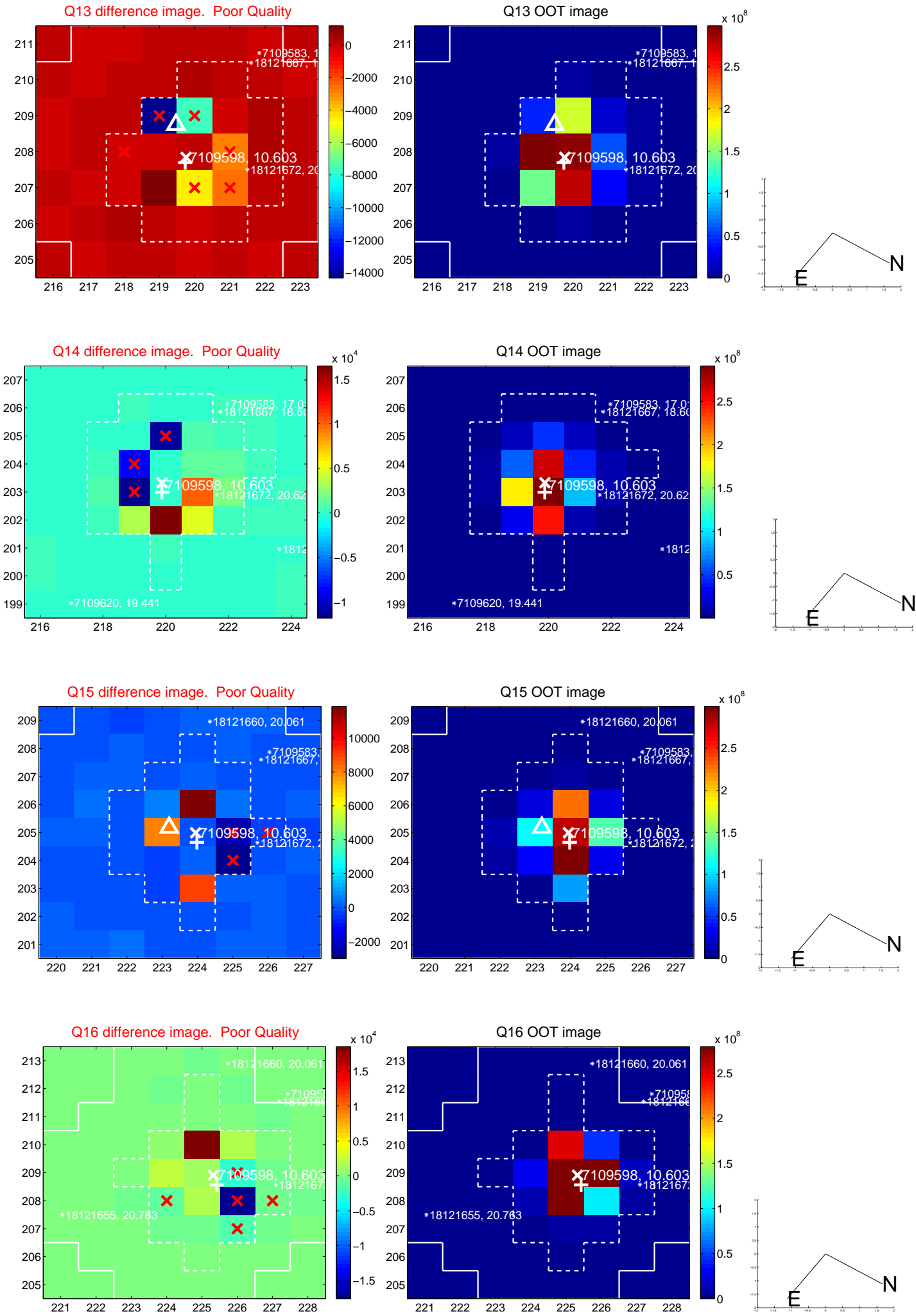
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



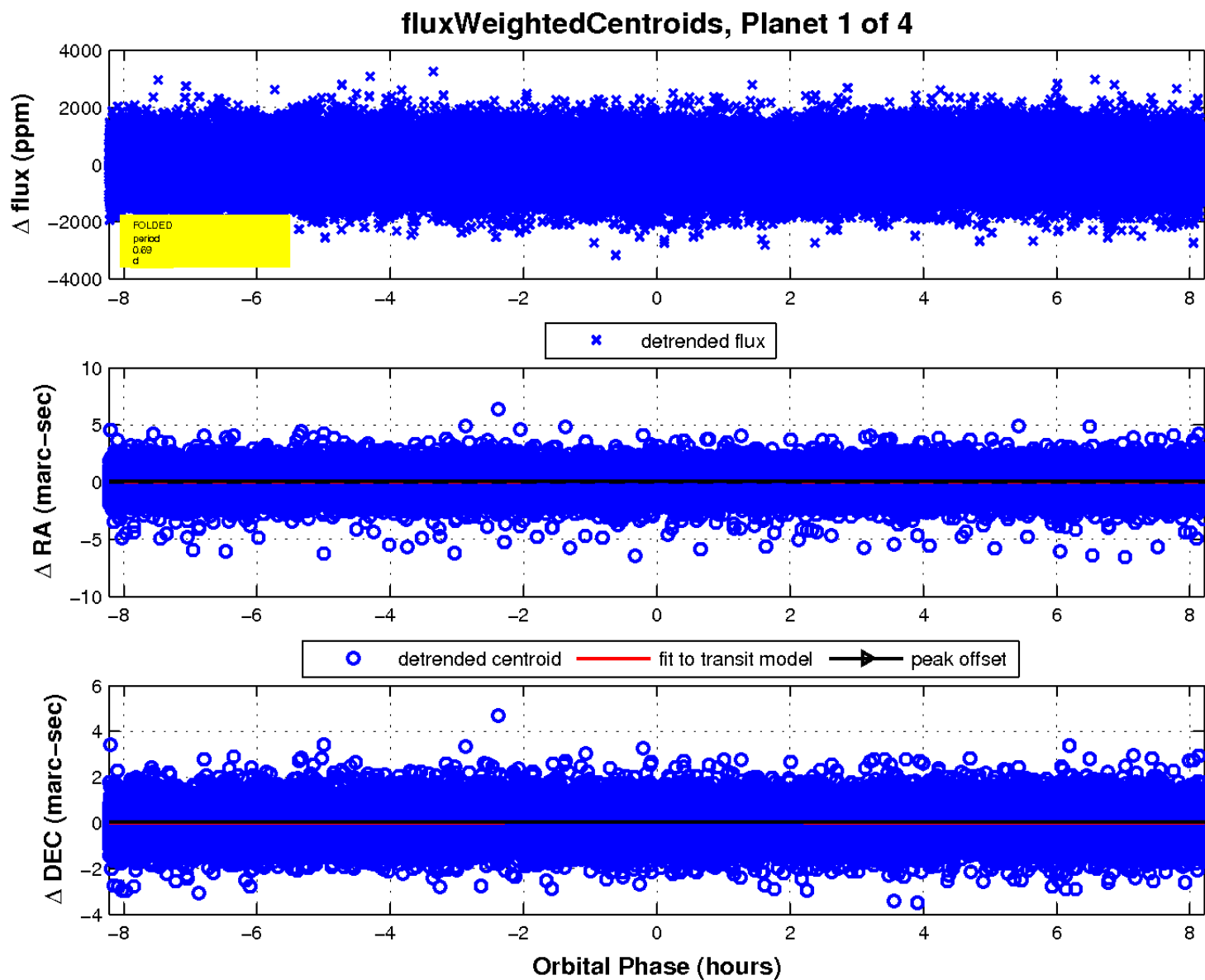
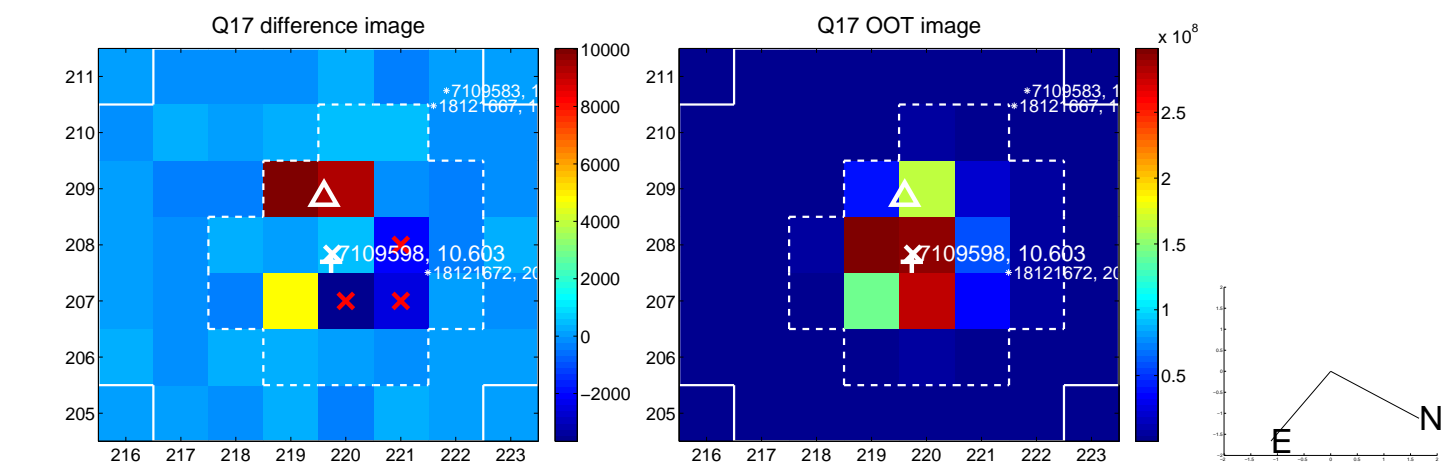
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

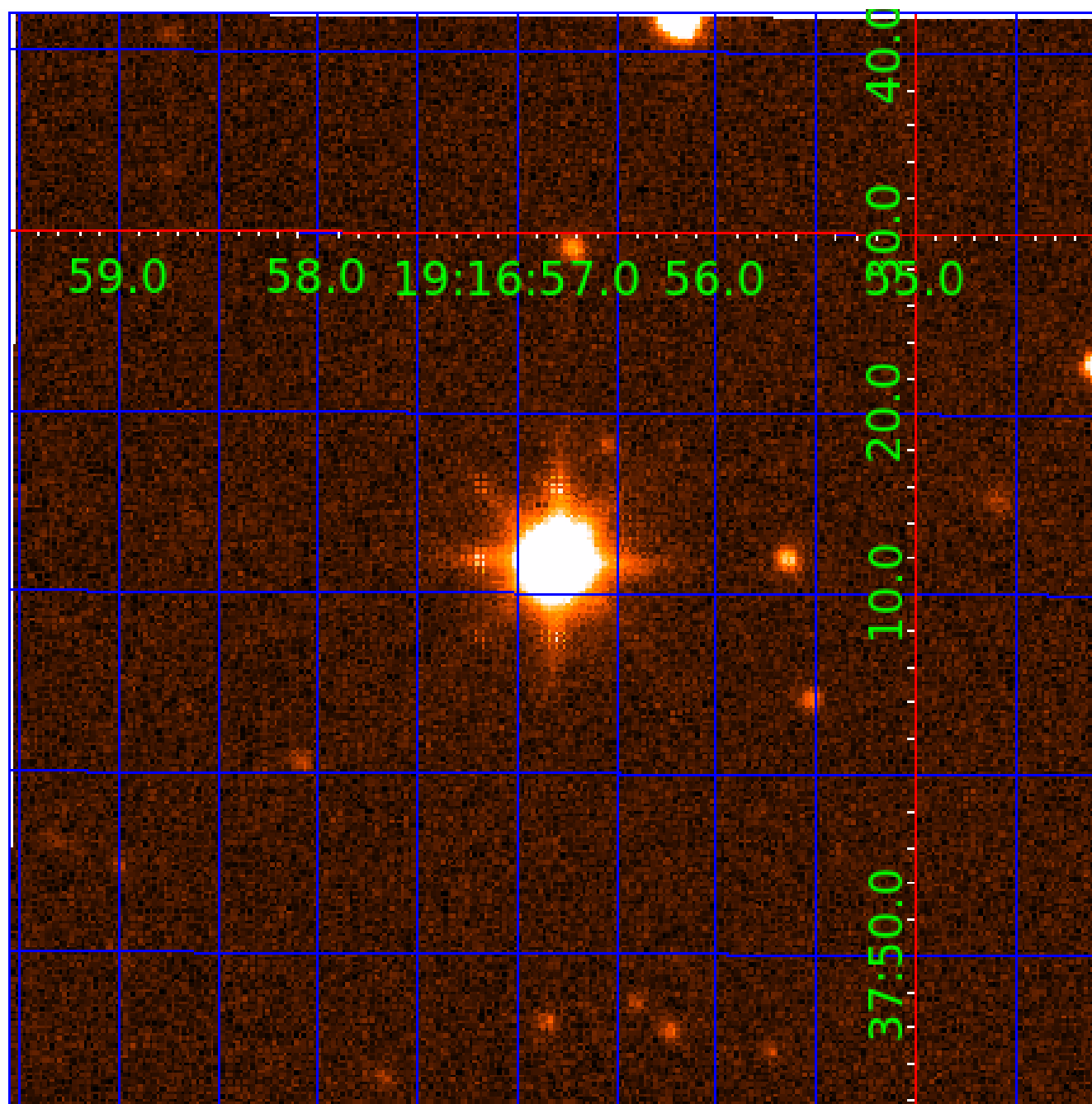


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 007109598

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})
007109598-01	OBS	No	0.685040	131.592712	72.6	4.622	13.9	11.1	2.30	7182	1.99	36313.93
007109598-02	OBS	No	44.596854	134.718716	2015.5	1.095	19.5	14.0	2.30	7182	10.53	138.66
007109598-03	OBS	No	17.131766	142.054228	474.4	7.117	14.4	14.0	2.30	7182	5.10	496.55
007109598-04	OBS	No	8.563904	137.688683	656.3	1.261	13.0	15.3	2.30	7182	6.95	1251.60

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007109598-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_SATURATED
007109598-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED—HALO_GHOST
007109598-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_SATURATED
007109598-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

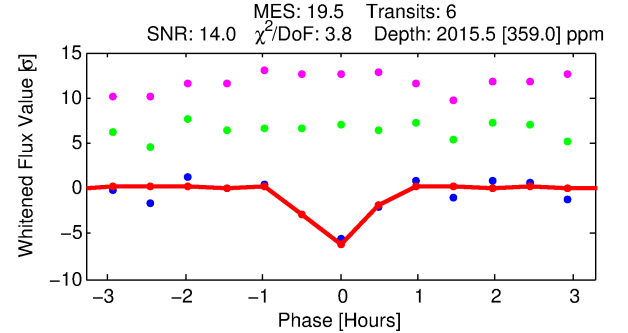
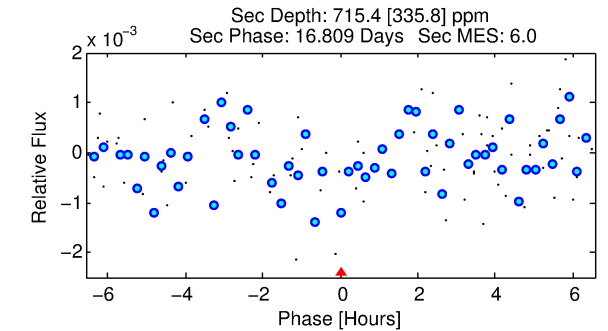
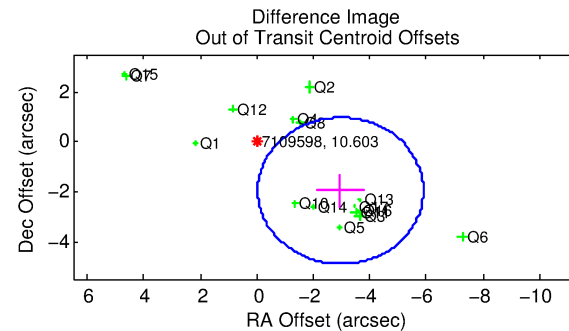
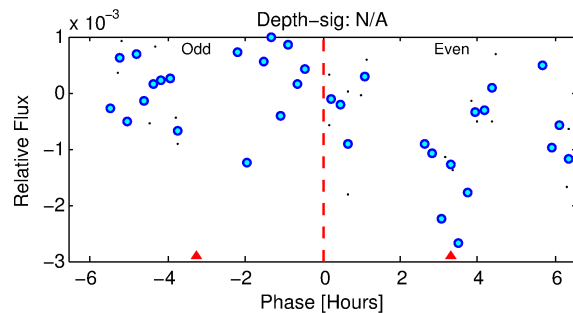
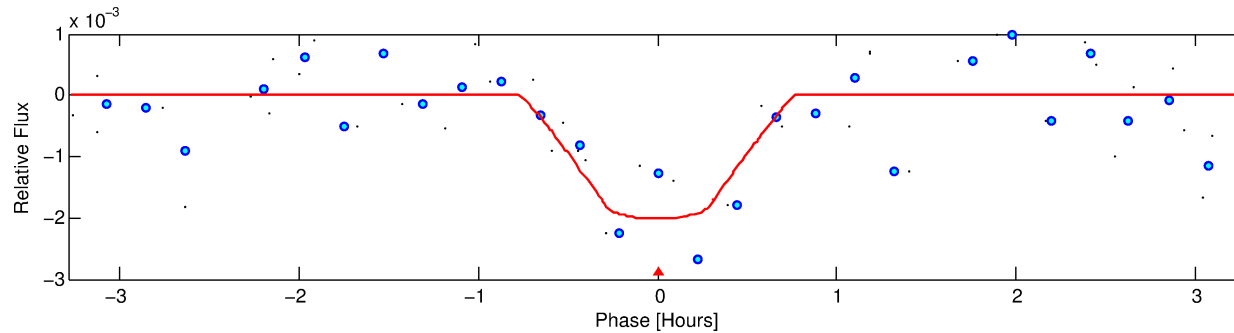
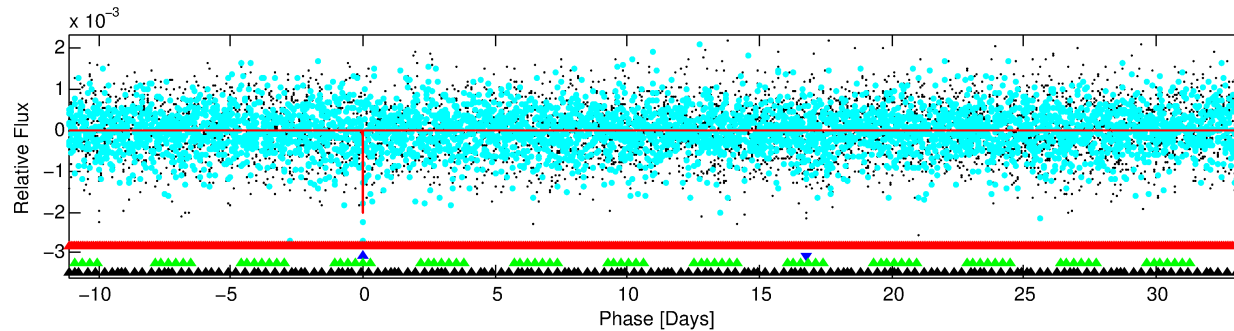
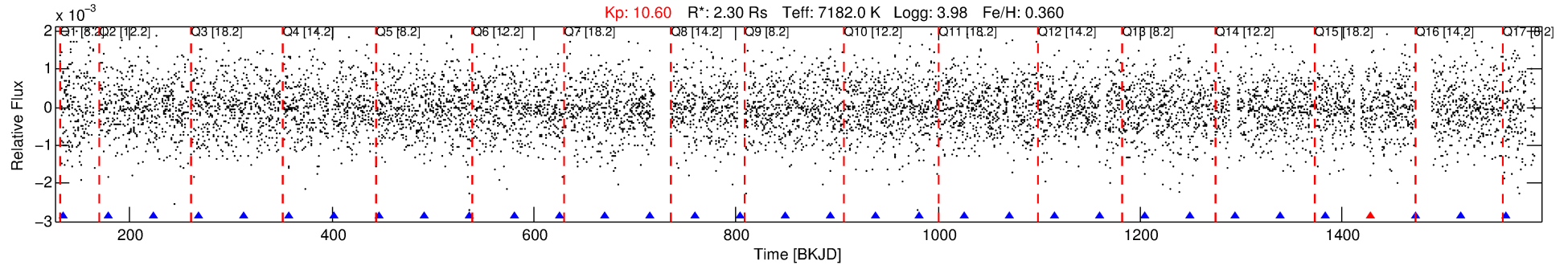
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007109598-02

No Significant Match Found

DV One-Page Summary

KIC: 7109598 Candidate: 2 of 4 Period: 44.597 d



DV Fit Results:

Period = 44.59685 [0.00027] d
Epoch = 134.7187 [0.0049] BKJD
Rp/R* = 0.0420 [0.0356]
a/R* = 321.30 [1542.59]
b = 0.14 [33.76]
Seff = 138.66 [30.56]
Teq = 875 [48] K
Rp = 10.53 [9.10] Re
a = 0.3016 [0.0427] AU
Ag = 322.84 [573.07] [0.56σ]
Teffp = 5735 [2527] K [1.92σ]

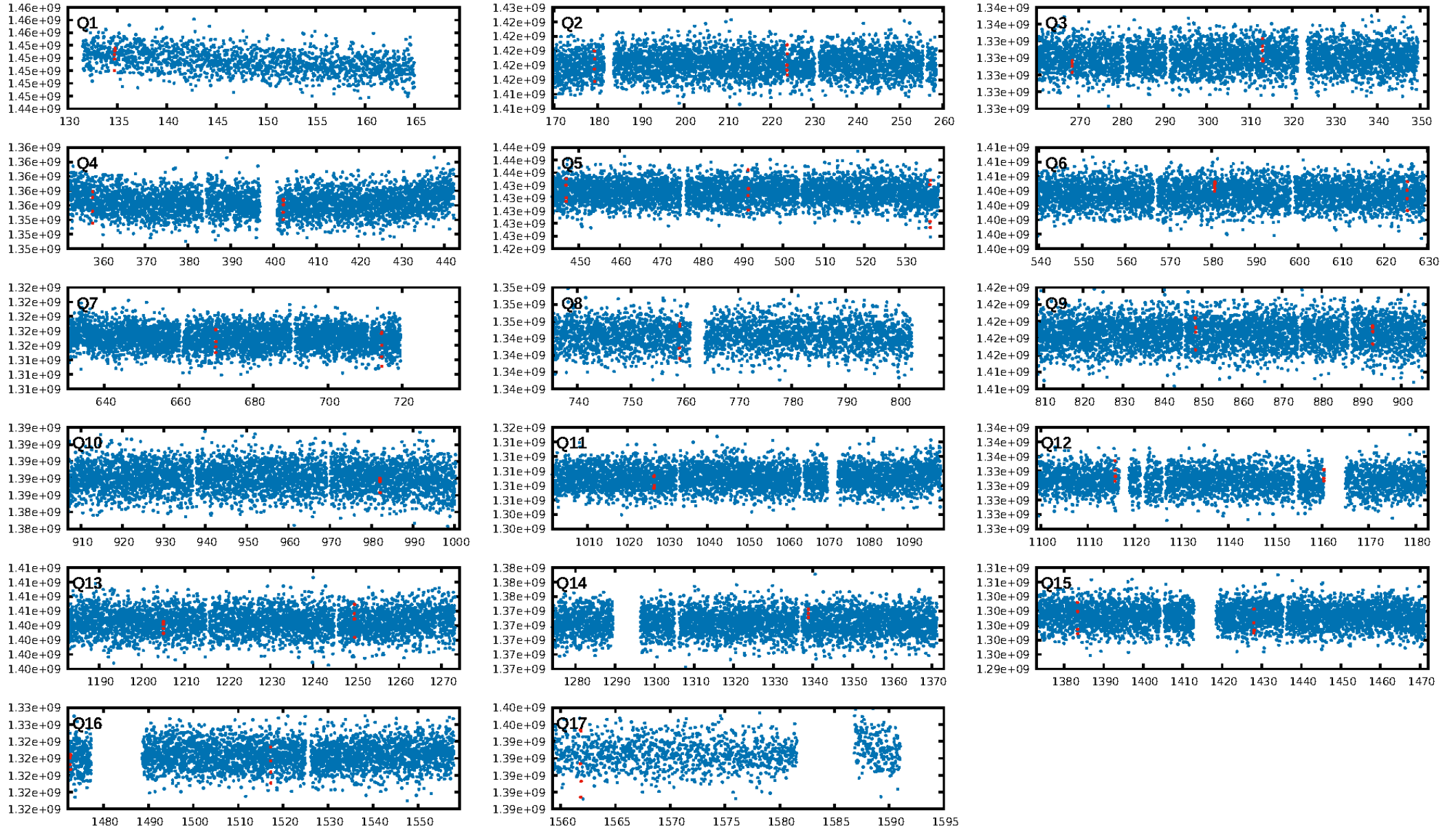
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [91.54σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 4.9%
ModelChiSquareGof-sig: 46.3%
Bootstrap-pfa: 9.71e-25
RollingBand-fgt: 0.80 [4/5]
GhostDiagnostic-chr: 0.1941
Centroid-sig: 2.3%
Centroid-so: 0.275 arcsec [2.70σ]
OotOffset-rm: 3.554 arcsec [3.64σ]
KicOffset-rm: 2.539 arcsec [2.67σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.31 [5/16]
DiffImageOverlap-fno: 0.12 [2/17]

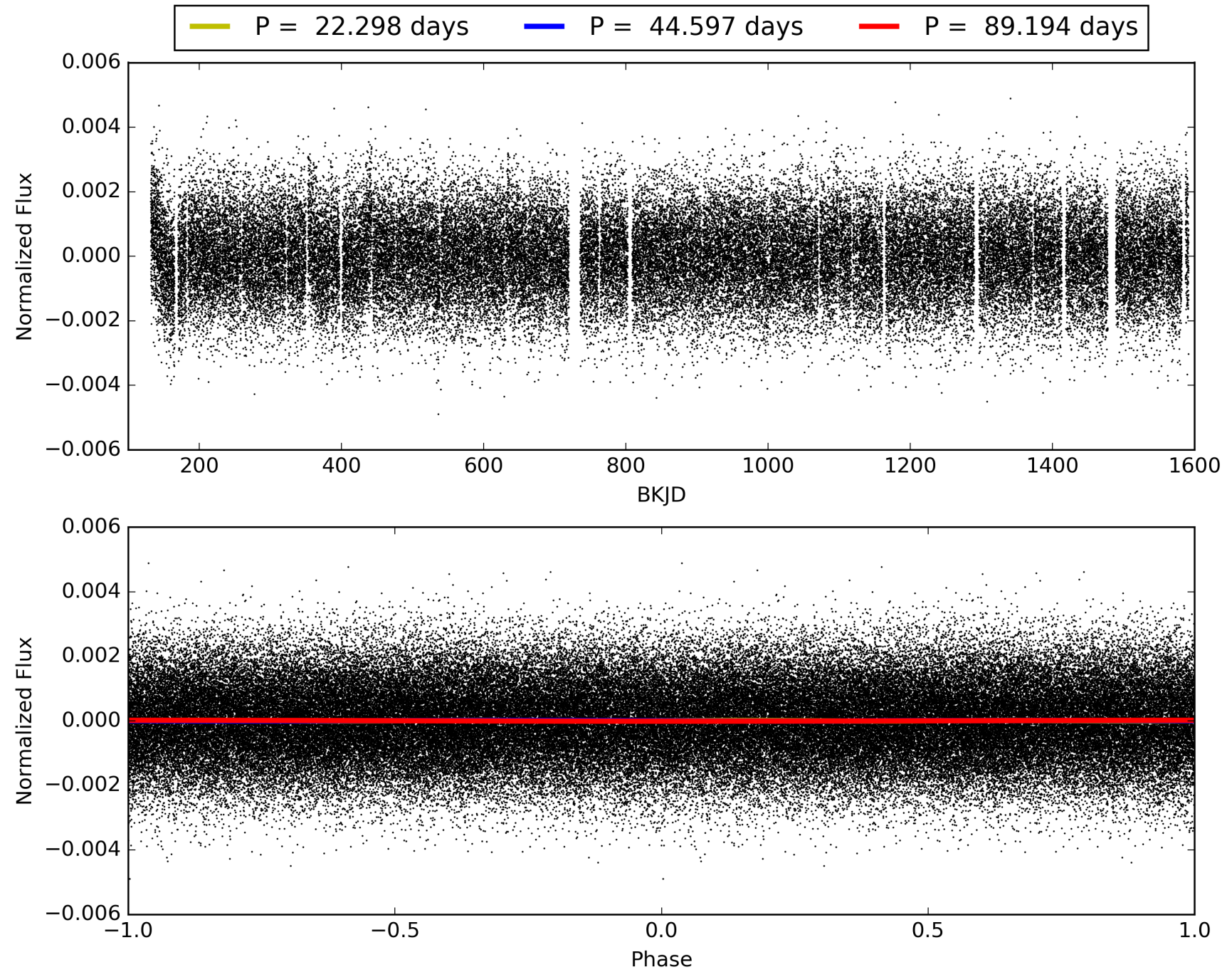
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:36:54 Z

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

TCE 007109598-02, PDC Light Curves

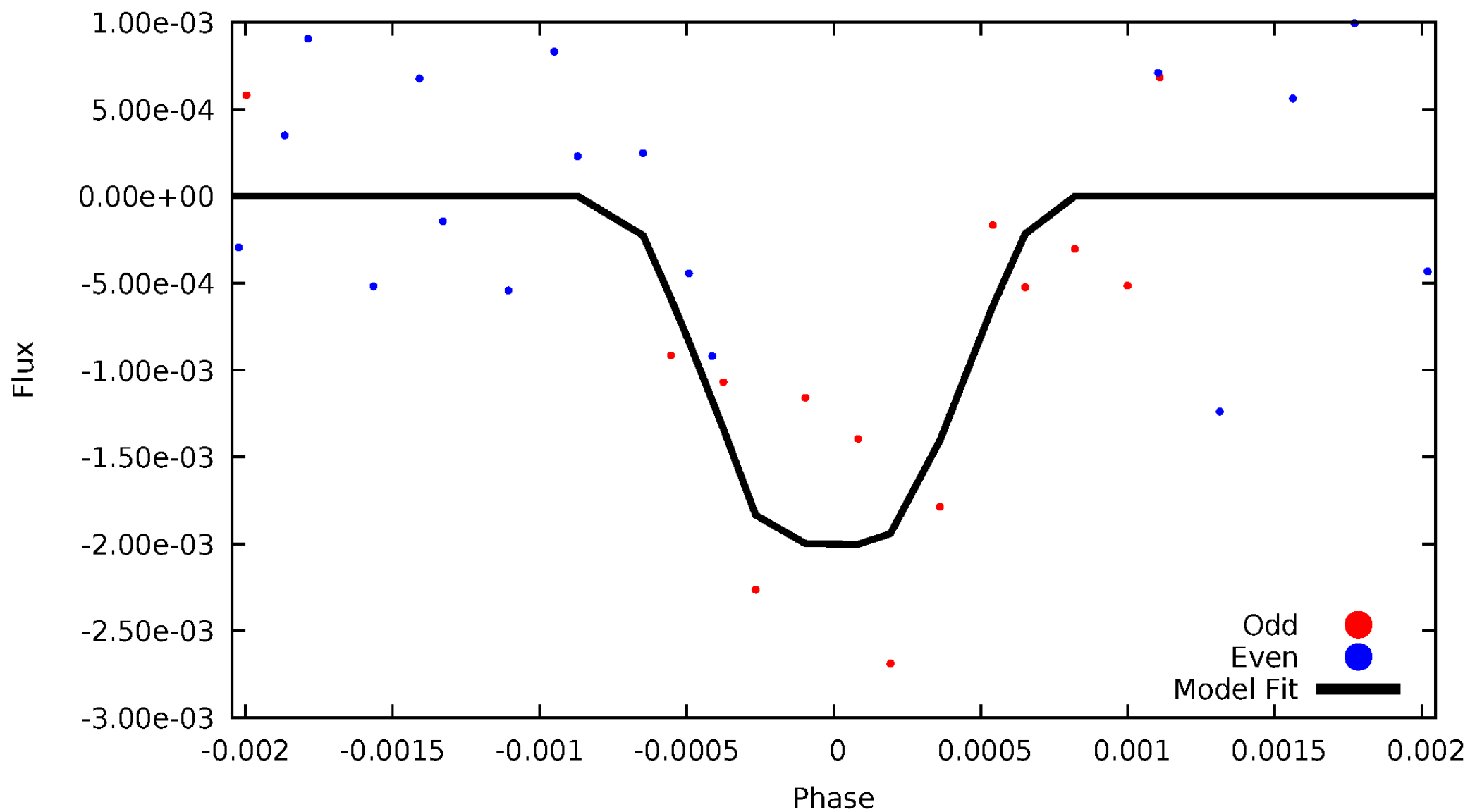


TCE 007109598-02



DV Odd/Even

TCE 007109598-02

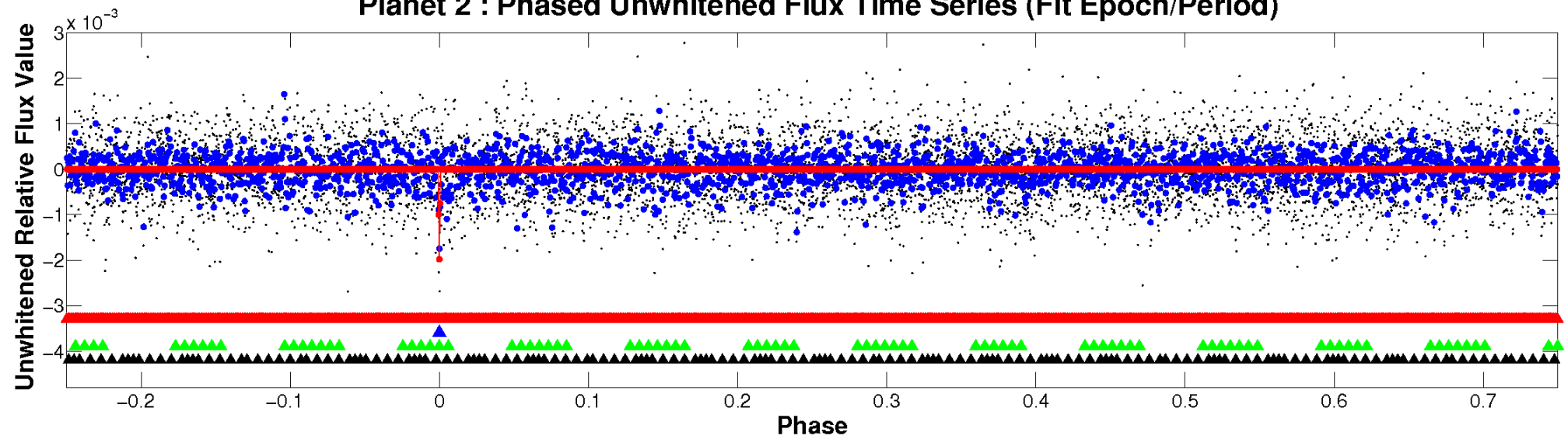


ALT Odd/Even

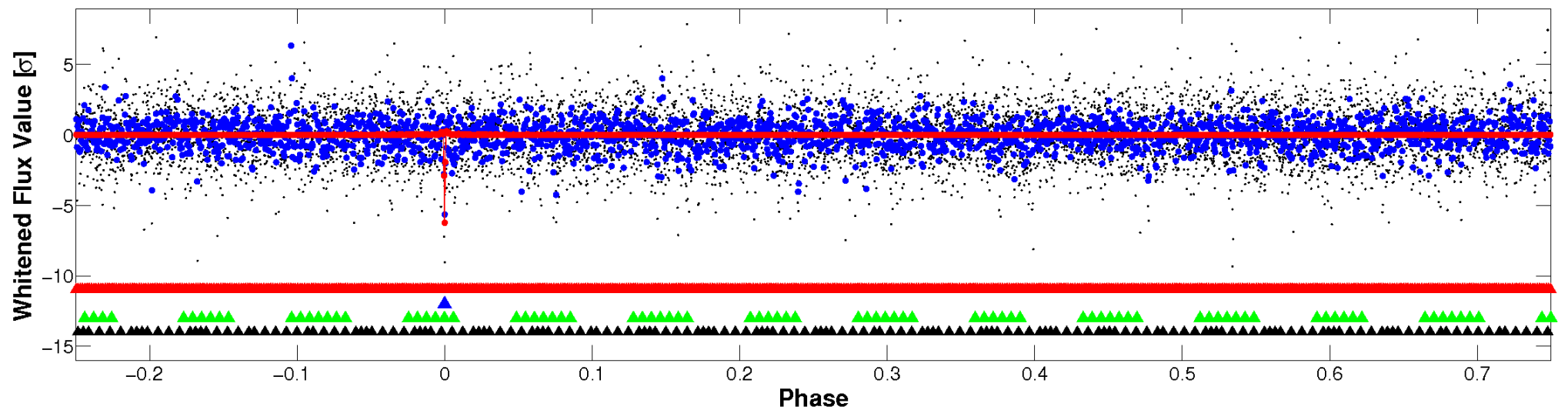
This plot does not exist for this TCE.

Non-Whitened Vs. Whitened Light Curve

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

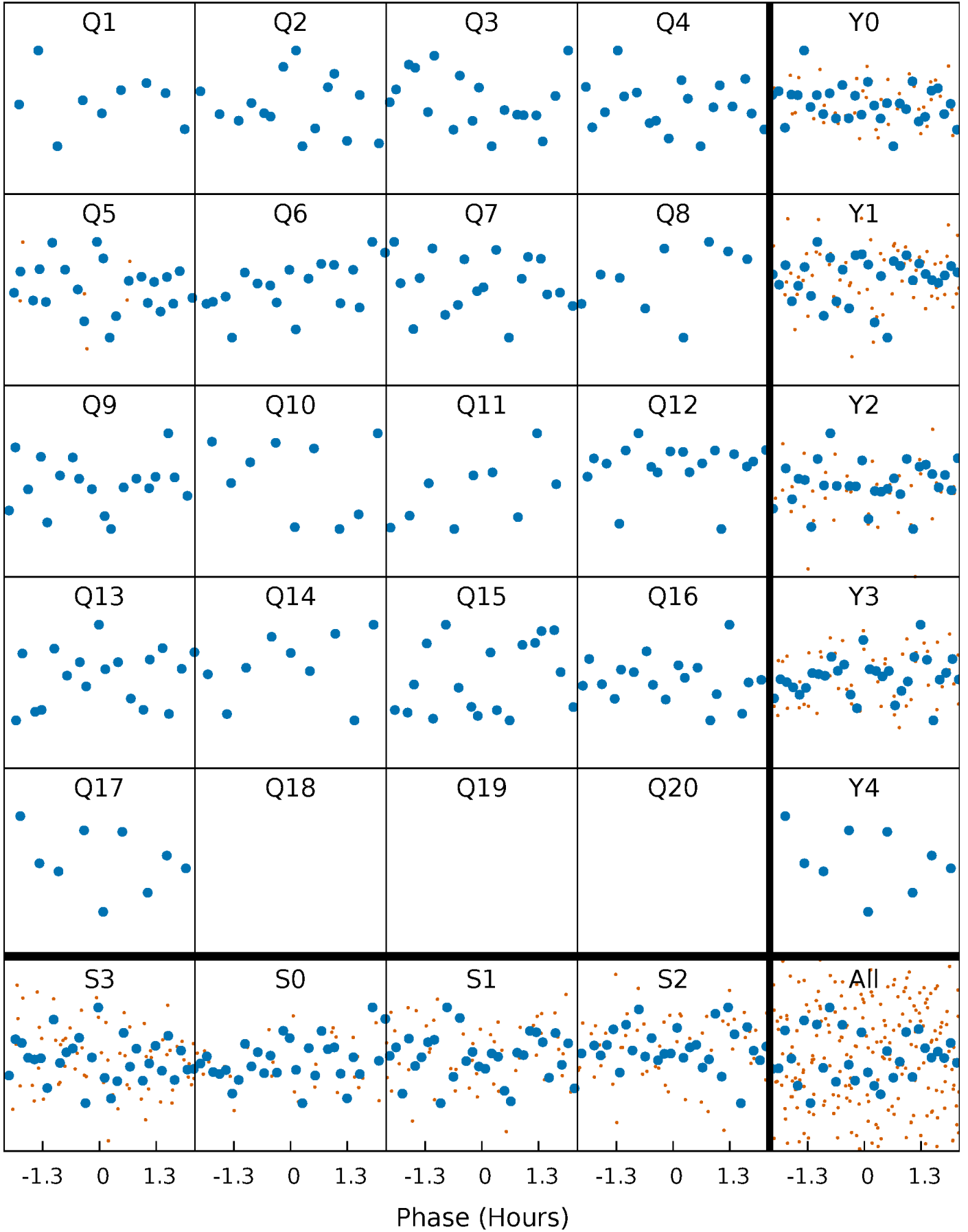


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



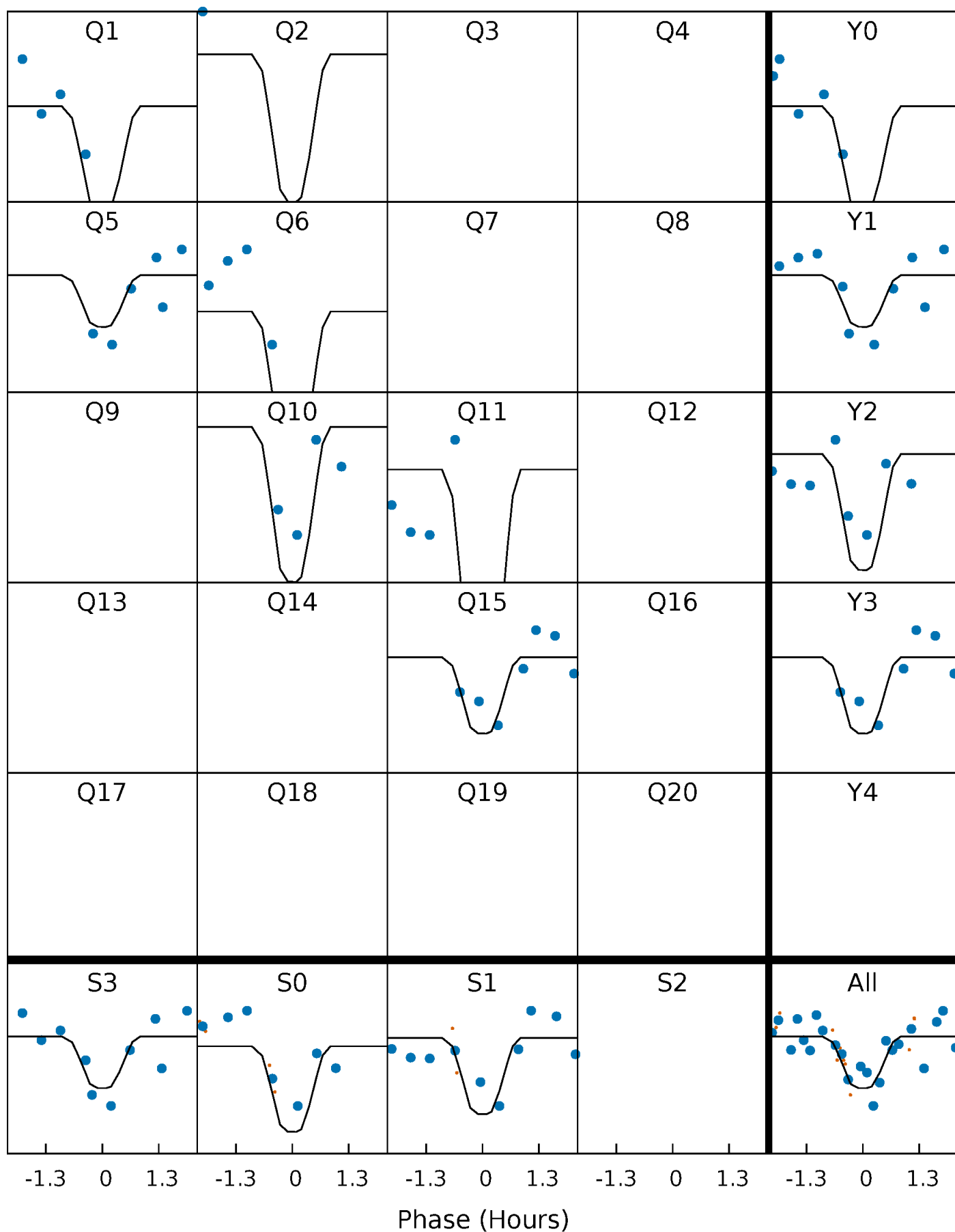
PDC Quarter-Phased Transit Curves

TCE 007109598-02 P= 44.596854 Days $T_0=134.718716$ (BKJD)



DV Quarter-Phased Transit Curves

TCE 007109598-02 P= 44.596854 Days $T_0=134.718716$ (BKJD)

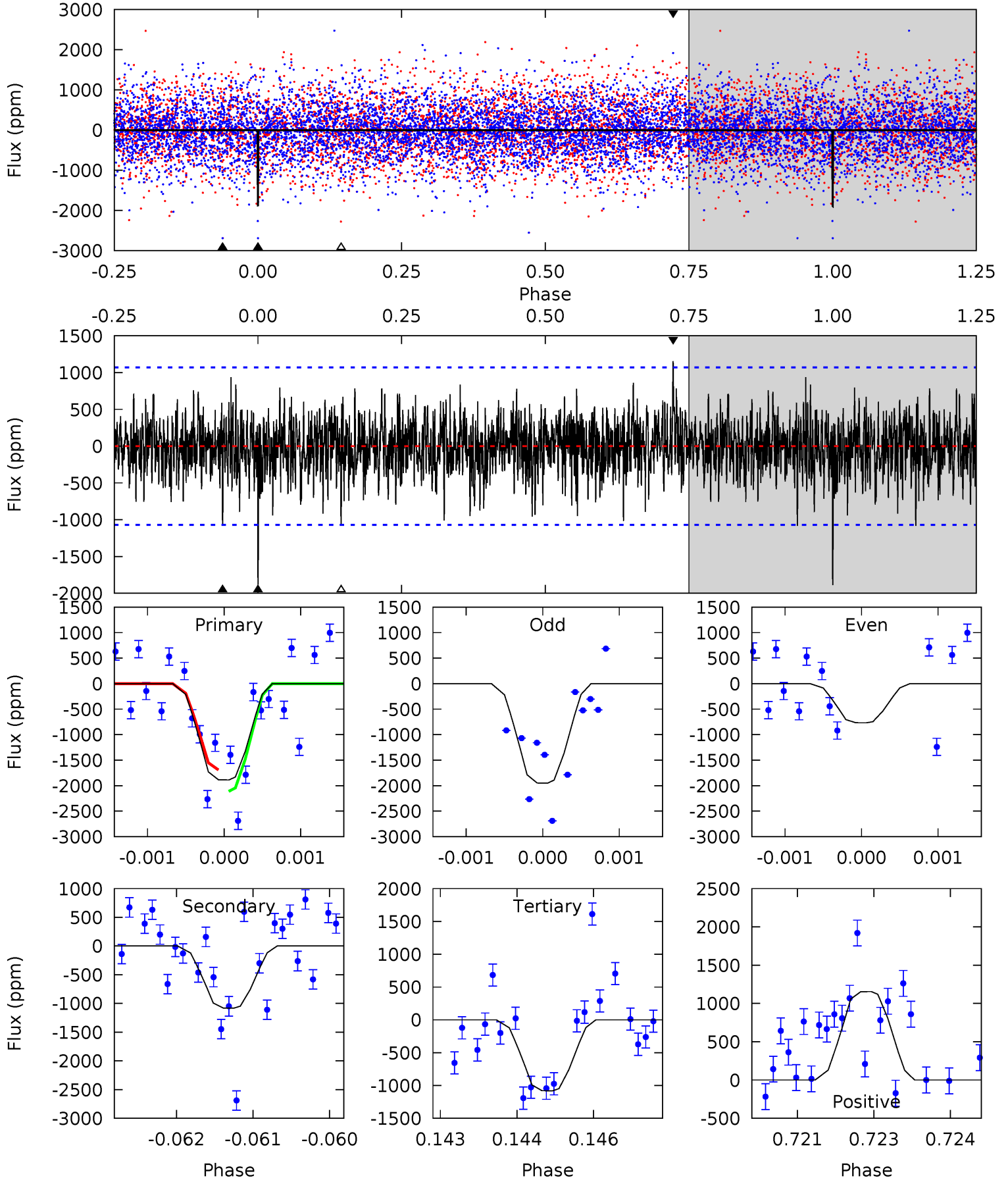


This plot does not exist for this TCE.

DV Model-Shift Uniqueness Test

007109598-02, P = 44.596854 Days, E = 90.121862 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.55	5.47	5.47	5.84	5.40	3.22	1.51	4.08	3.70	0.00	-0.37	2.39	1.13	0.38	1.04



Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.

Stellar Parameters For KIC 007109598

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	7182^{+71}_{-93}	$3.979^{+0.121}_{-0.099}$	$0.360^{+0.050}_{-0.150}$	$2.300^{+0.368}_{-0.368}$	$1.838^{+0.116}_{-0.154}$	$0.213^{+0.122}_{-0.072}$
	+1%/-1%	+3%/-2%	+14%/-42%	+16%/-16%	+6%/-8%	+57%/-34%
Source	SPE68	SPE68	SPE68	DSEP		

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

Secondary Eclipse Parameters for KIC 007109598-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-1082 \pm 198	$11.74^{+8.25}_{-7.63}$	1219^{+47}_{-52}	6000^{+5661}_{-1304}	413^{+3002}_{-277}
Alt.	N/A	N/A	N/A	N/A	N/A

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

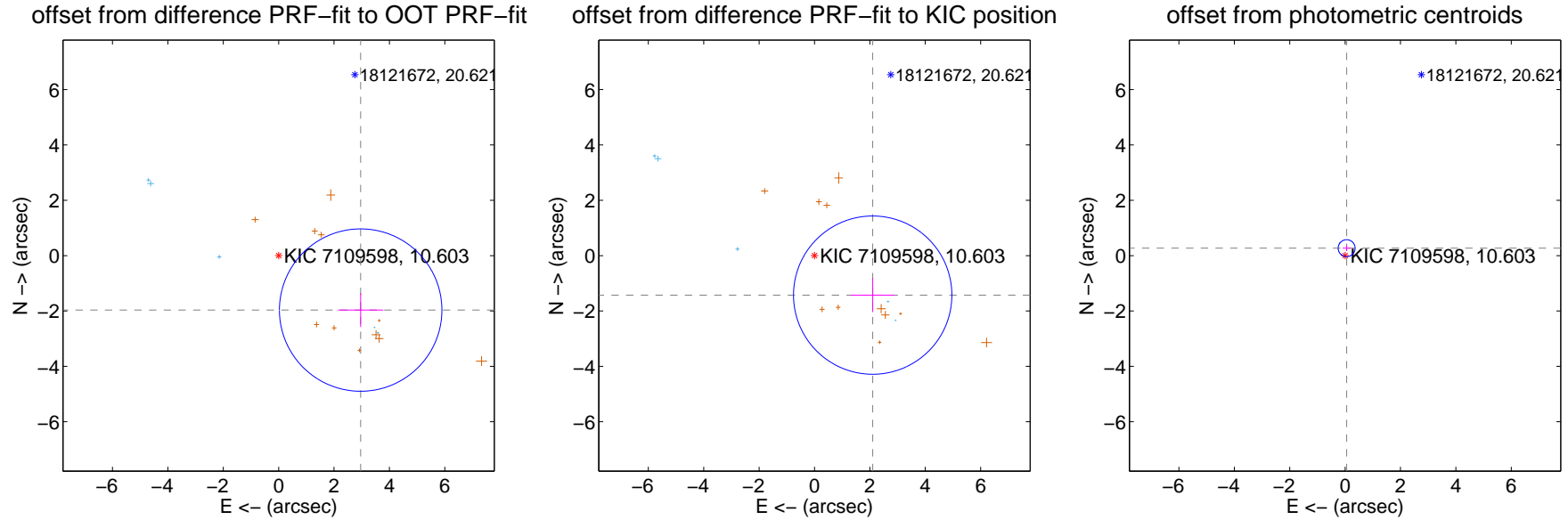
DV Centroid Data

Supplemental centroid analysis for 007109598-02. **Kepler magnitude: 10.60**. Transit SNR 13.99

There are 5 quarters with good PRF difference image offsets

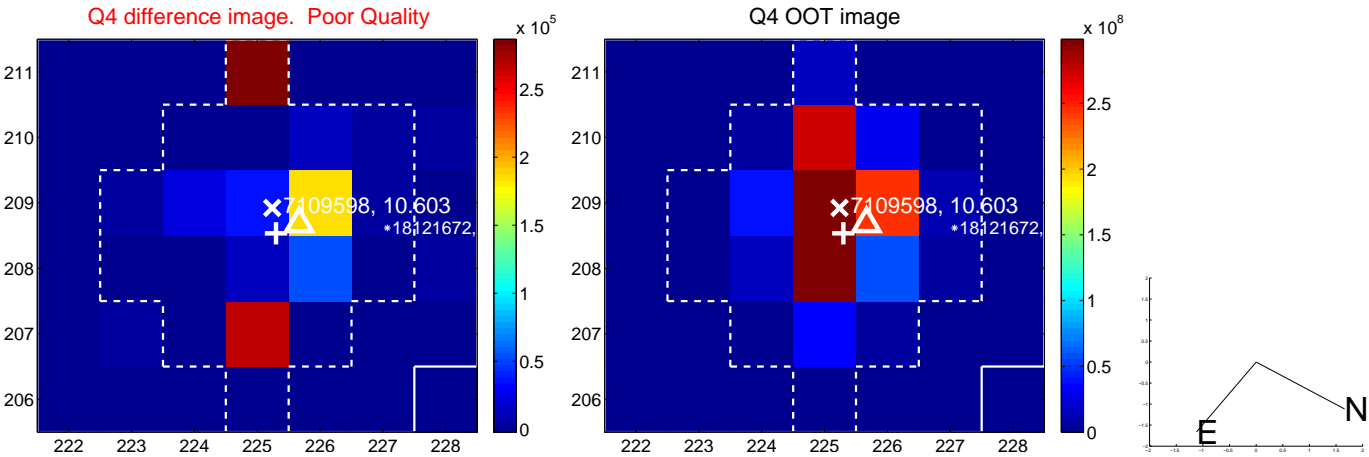
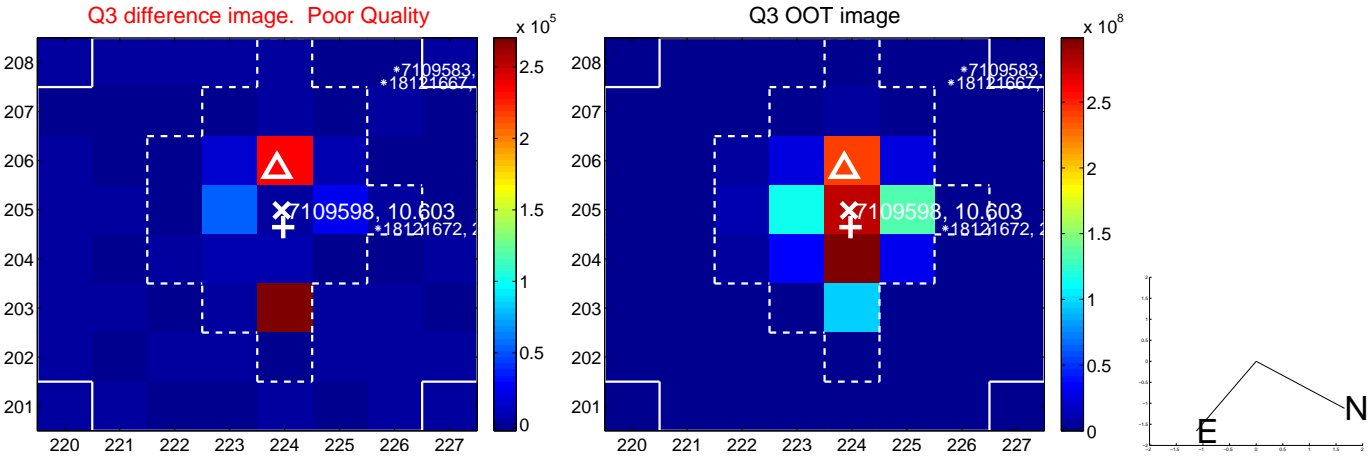
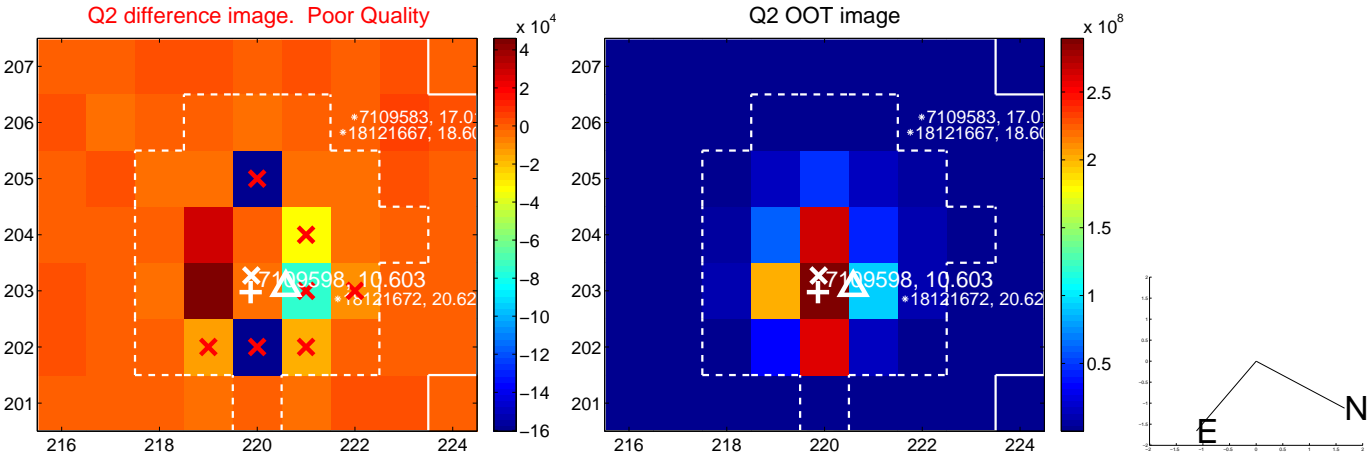
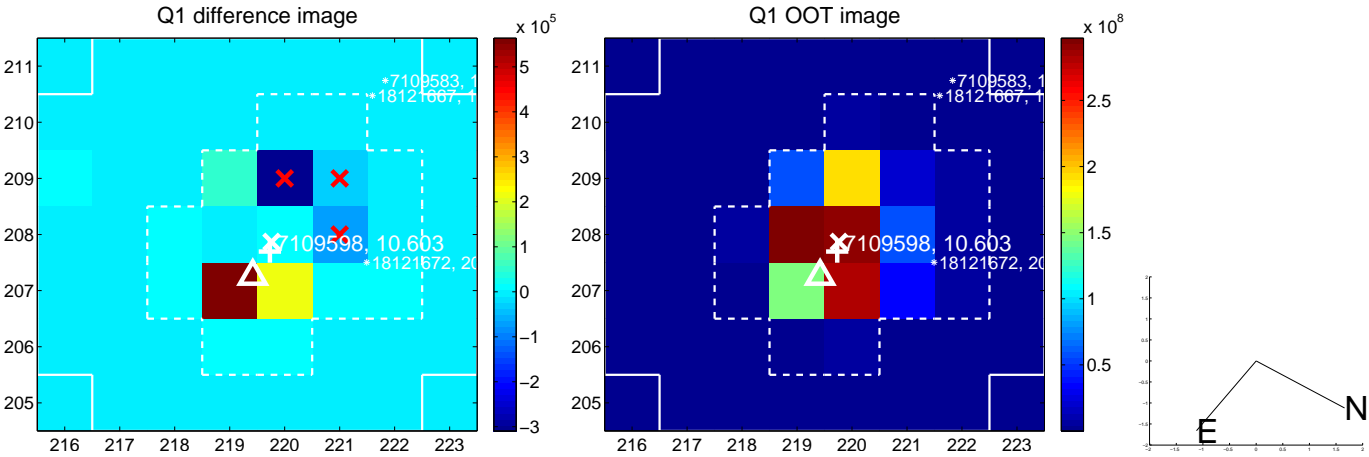
The direct PRF centroid is offset from the target star catalog position by about 0.59 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	3.554 ± 0.977	3.64	-2.960 ± 0.818	-1.966 ± 0.609
PRF-fit source offset from KIC position	2.539 ± 0.953	2.67	-2.101 ± 0.793	-1.426 ± 0.613
photometric centroid source offset	0.28 ± 0.10	2.70	-0.06 ± 0.14	0.27 ± 0.10

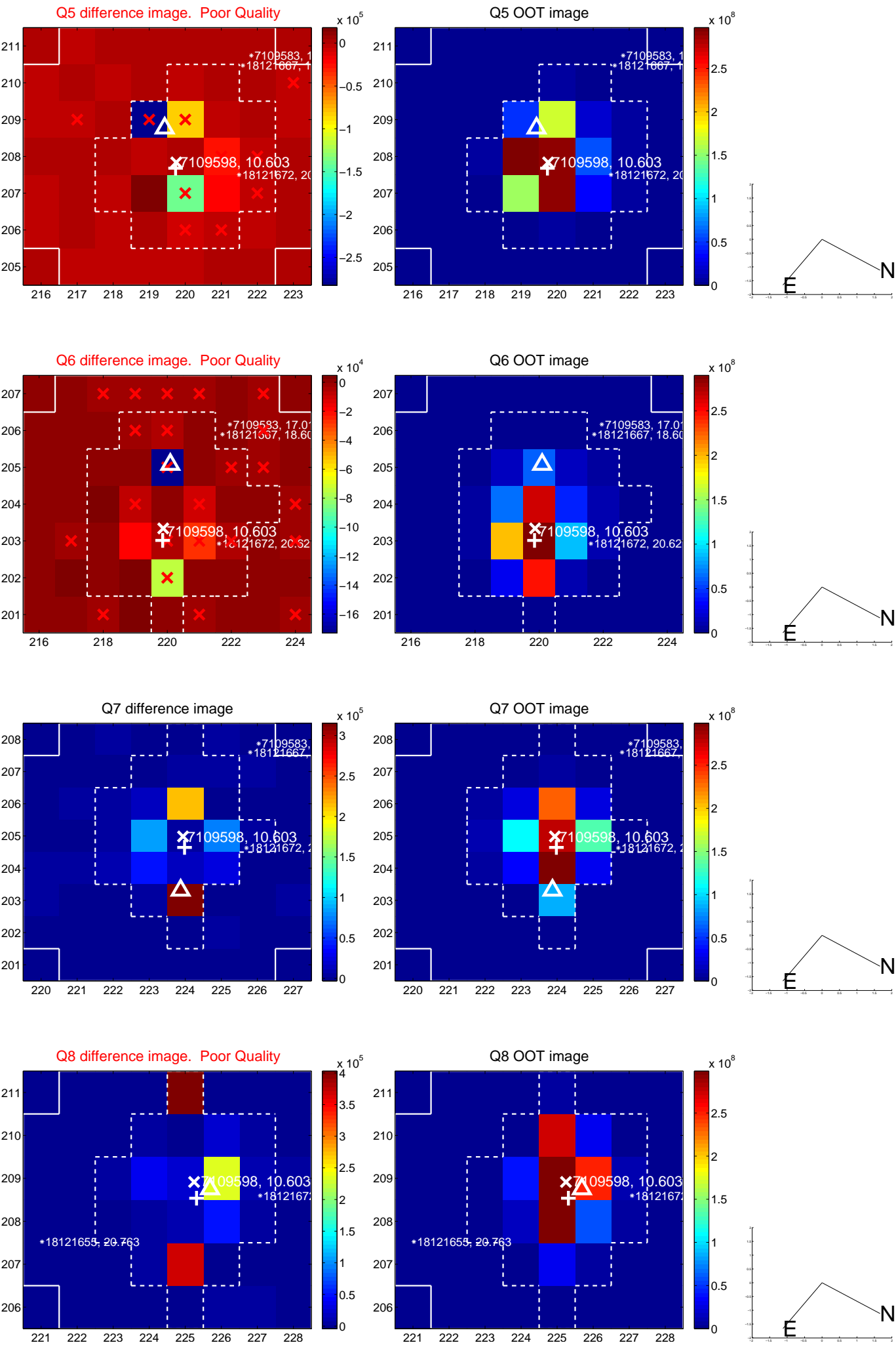


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

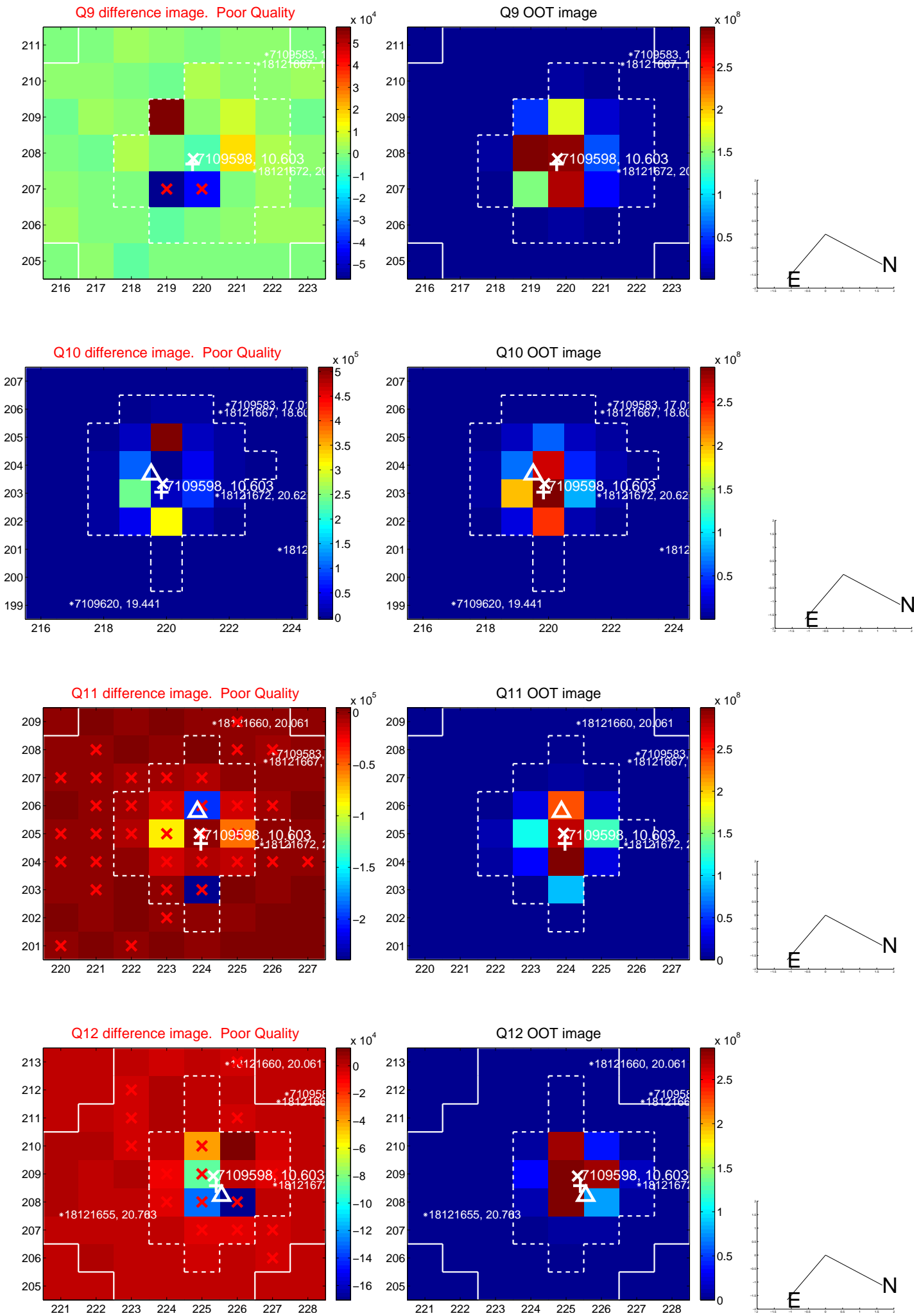
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



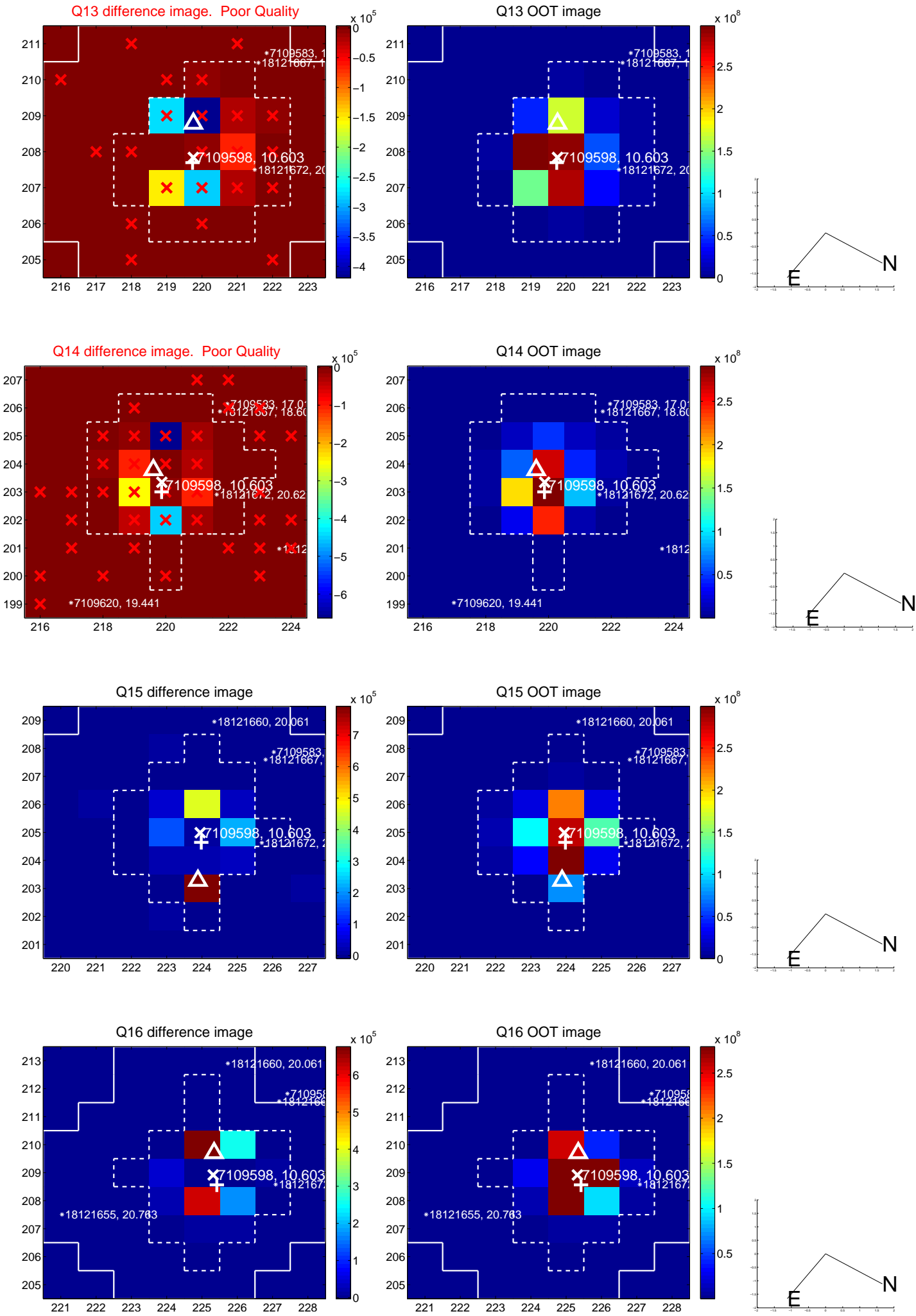
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



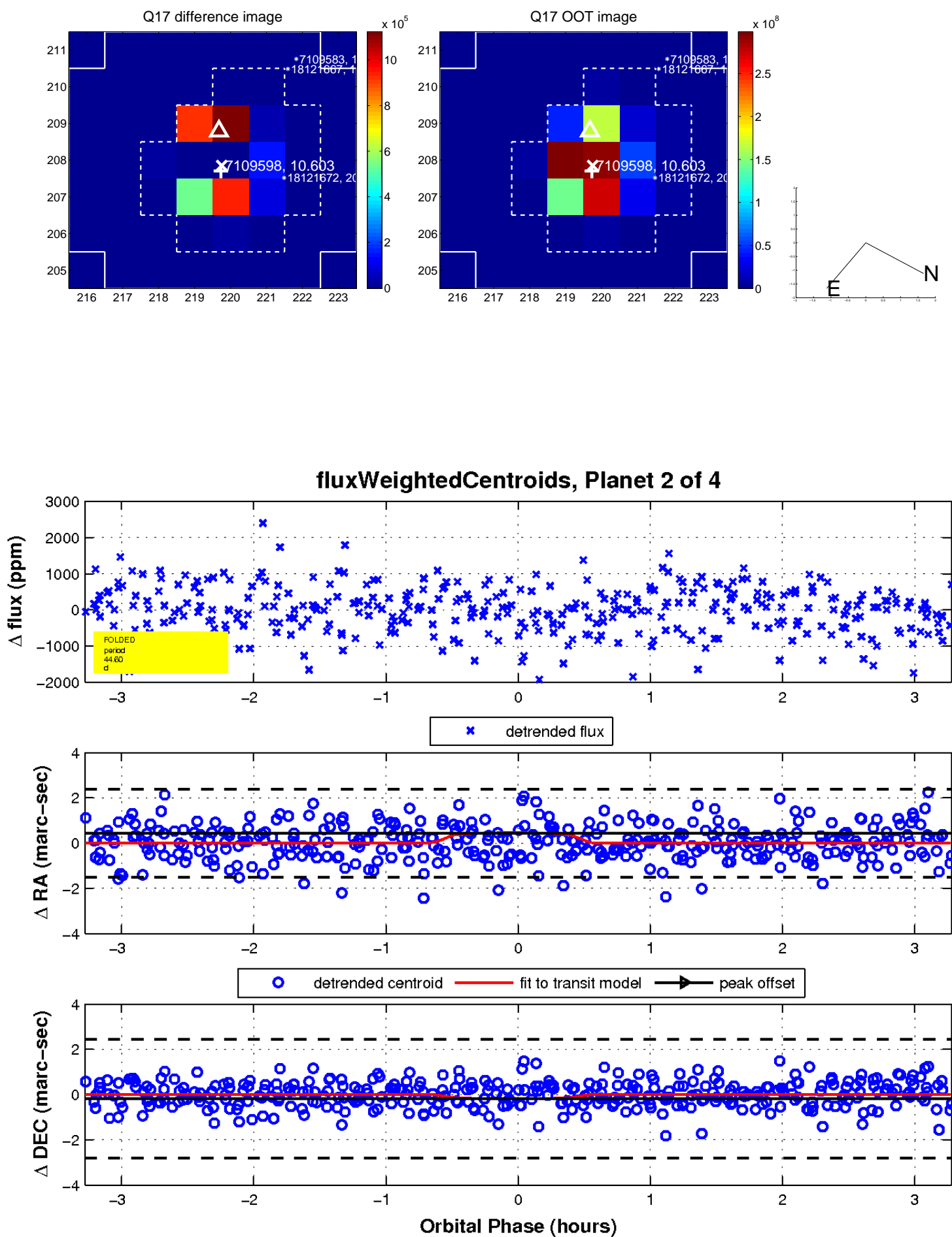
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

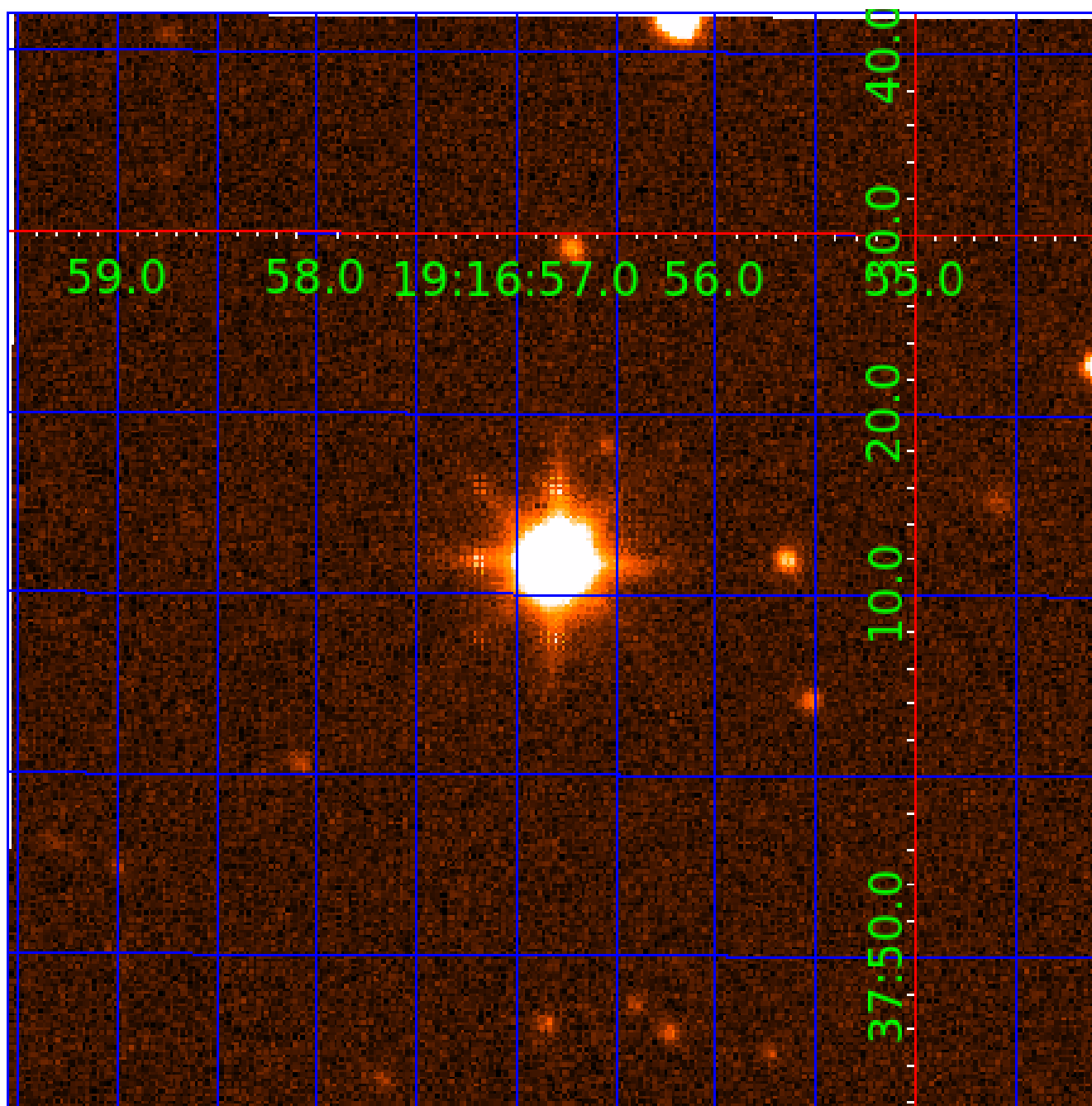


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 007109598

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})
007109598-01	OBS	No	0.685040	131.592712	72.6	4.622	13.9	11.1	2.30	7182	1.99	36313.93
007109598-02	OBS	No	44.596854	134.718716	2015.5	1.095	19.5	14.0	2.30	7182	10.53	138.66
007109598-03	OBS	No	17.131766	142.054228	474.4	7.117	14.4	14.0	2.30	7182	5.10	496.55
007109598-04	OBS	No	8.563904	137.688683	656.3	1.261	13.0	15.3	2.30	7182	6.95	1251.60

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007109598-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_SATURATED
007109598-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED—HALO_GHOST
007109598-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_SATURATED
007109598-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

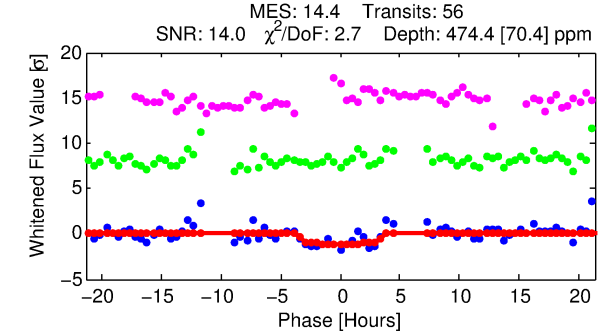
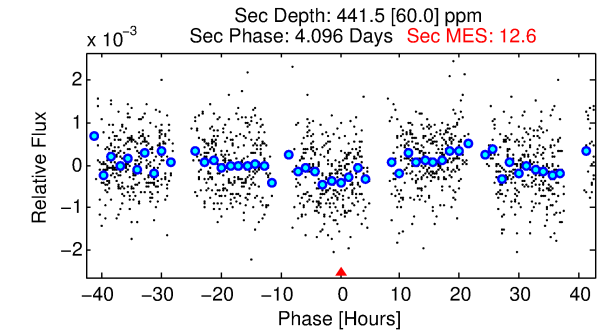
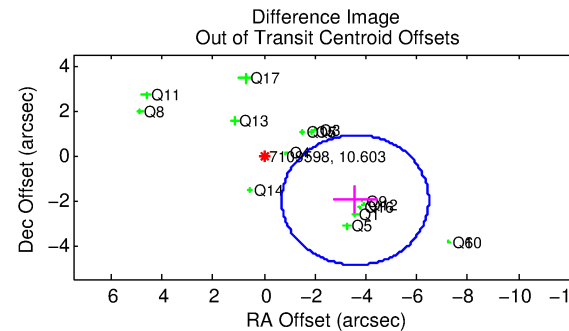
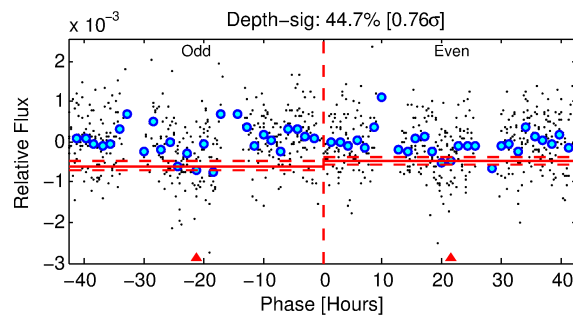
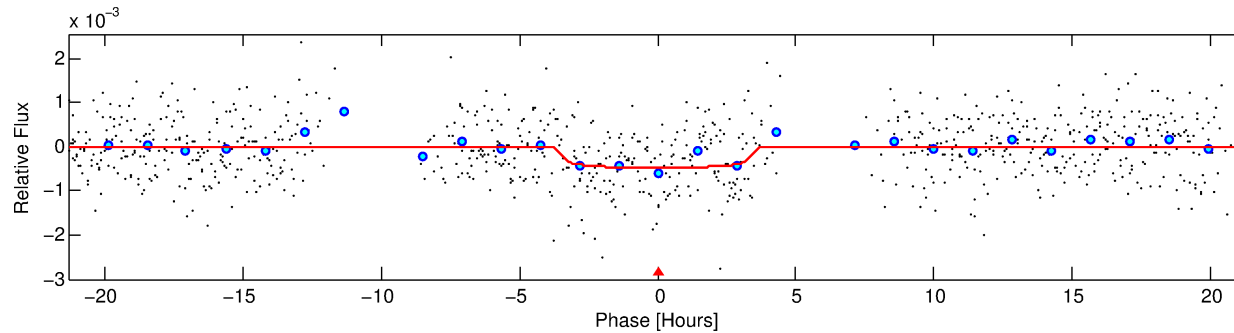
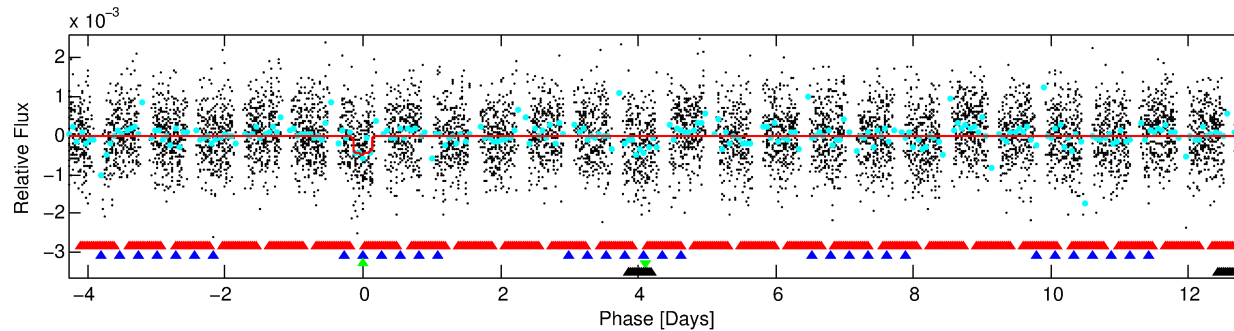
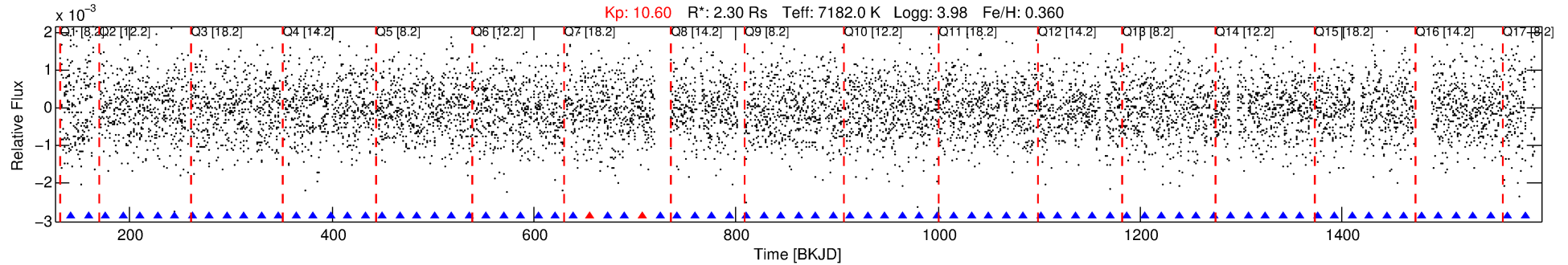
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007109598-03

No Significant Match Found

DV One-Page Summary

KIC: 7109598 Candidate: 3 of 4 Period: 17.132 d



DV Fit Results:

Period = 17.13177 [0.00123] d
Epoch = 142.0542 [0.0351] BKJD
Rp/R* = 0.0203 [0.0366]
a/R* = 18.13 [189.85]
b = 0.26 [37.06]
Seff = 496.54 [109.42]
Teq = 1204 [66] K
Rp = 5.10 [9.22] Re
a = 0.1594 [0.0225] AU
Ag = 237.34 [857.70] [0.28 σ]
Teffp = 7305 [6588] K [0.93 σ]

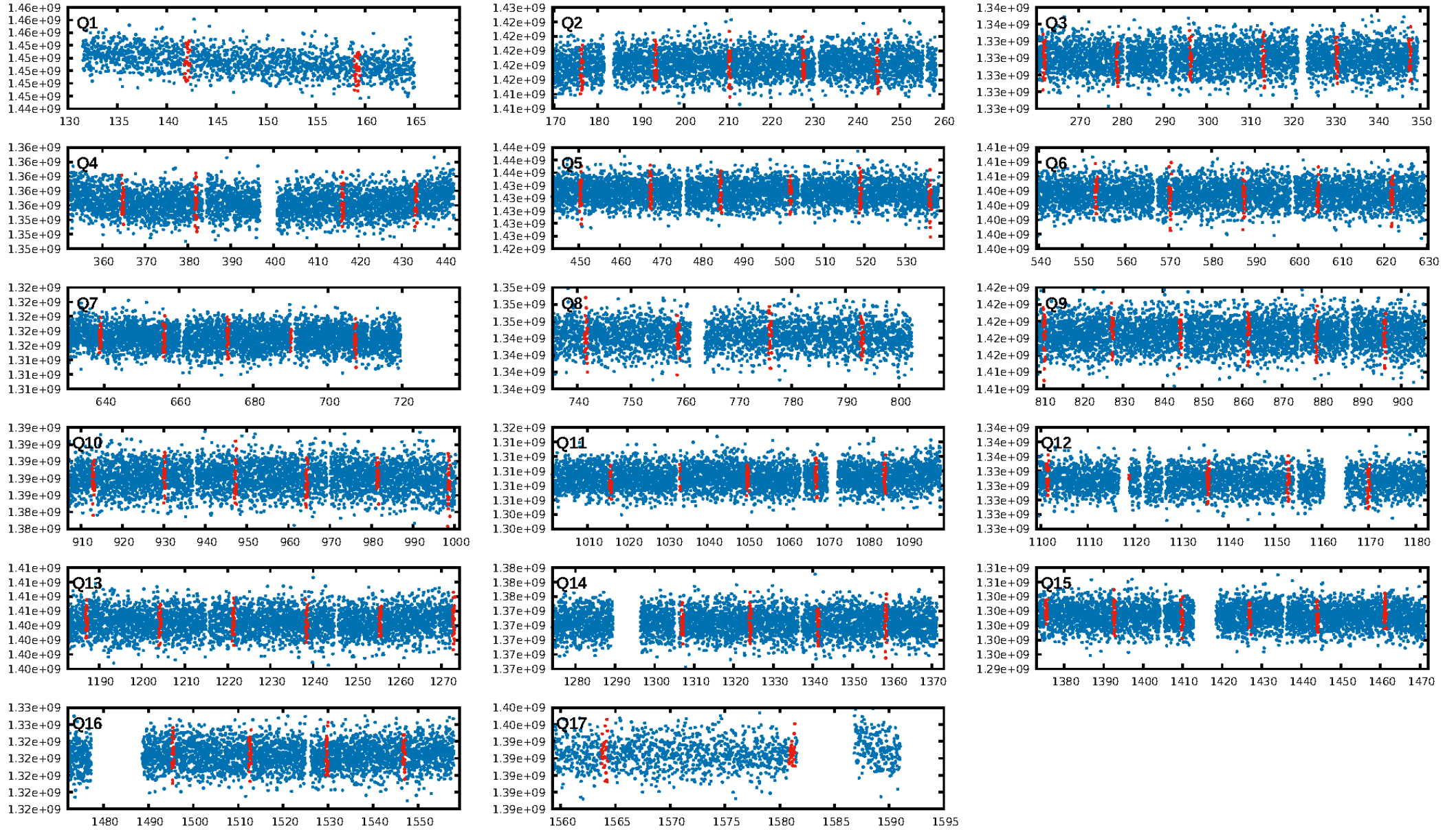
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [28.45 σ]
LongPeriod-sig: 100.0% [91.54 σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.49e-16
RollingBand-fgt: 0.96 [52/54]
GhostDiagnostic-chr: 0.7765
Centroid-sig: 16.9%
Centroid-so: 0.396 arcsec [2.38 σ]
OotOffset-rm: 4.105 arcsec [4.26 σ]
KicOffset-rm: 3.331 arcsec [3.22 σ]
OotOffset-st: 3/4/4/5 [16]
KicOffset-st: 3/4/4/5 [16]
DiffImageQuality-fgm: 0.25 [4/16]
DiffImageOverlap-fno: 0.00 [0/17]

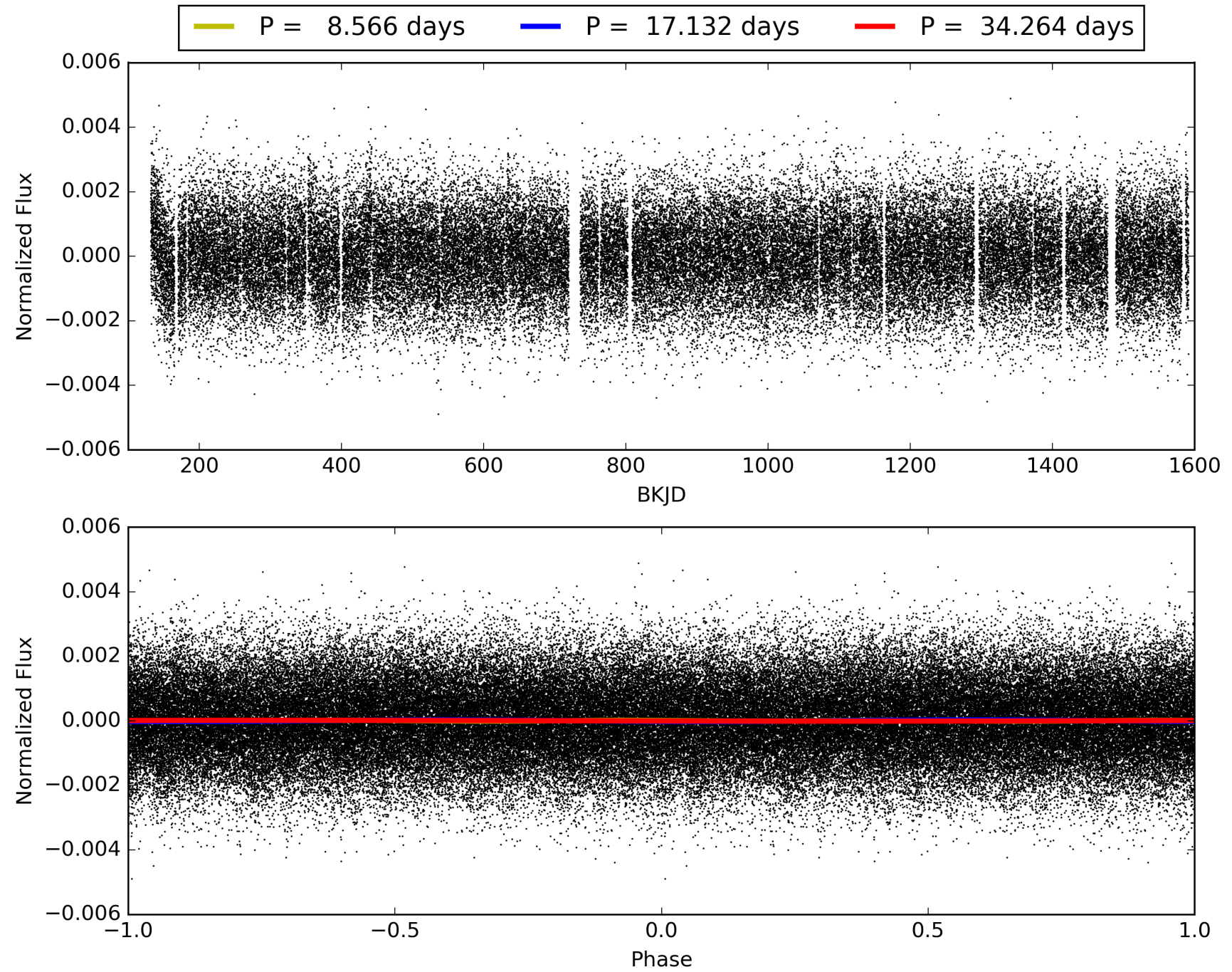
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:36:58 Z

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

TCE 007109598-03, PDC Light Curves

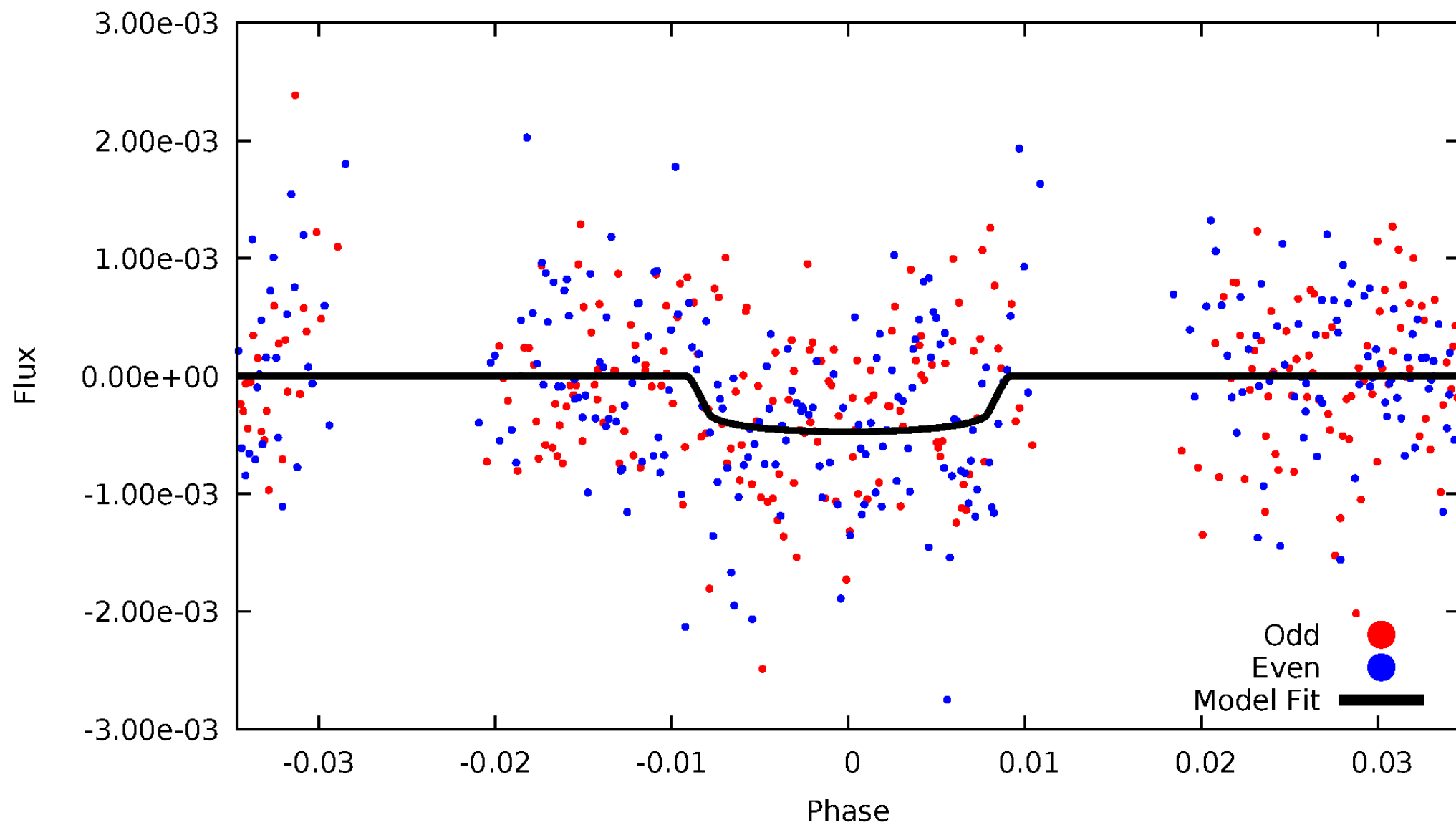


TCE 007109598-03



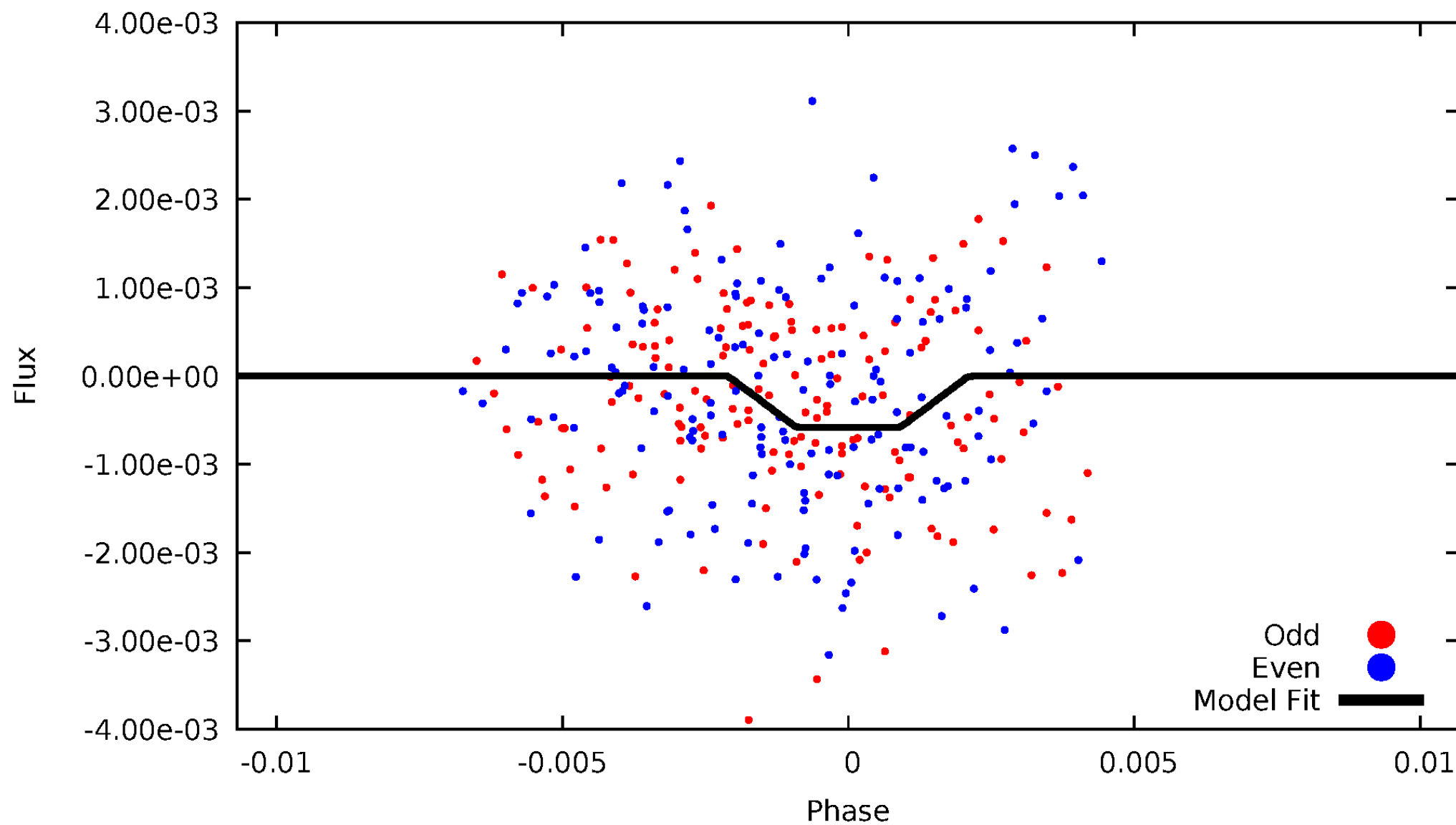
DV Odd/Even

TCE 007109598-03



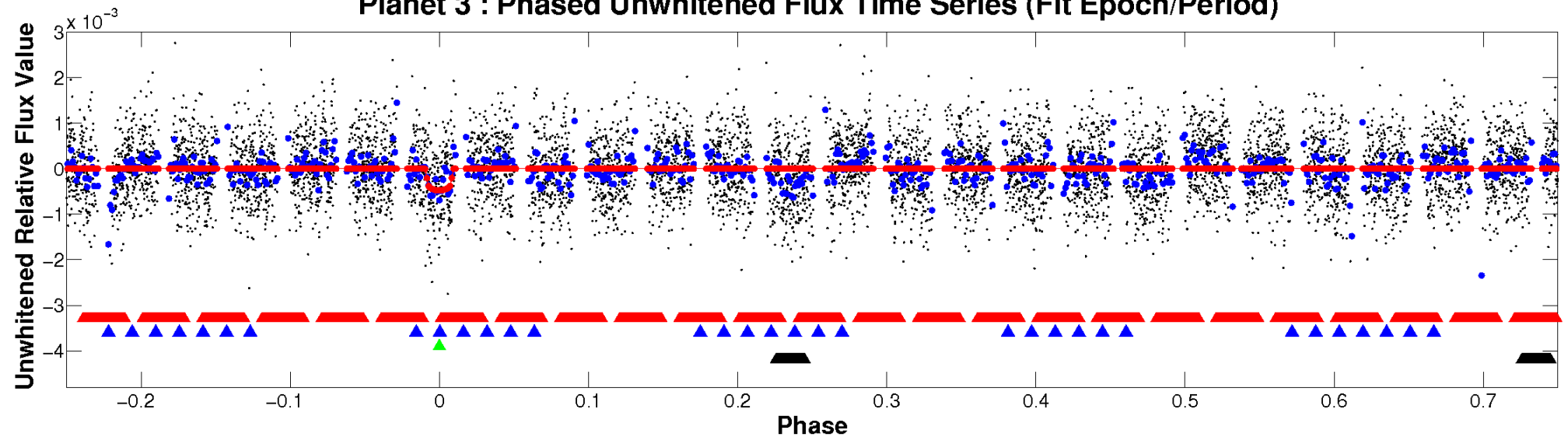
ALT Odd/Even

TCE 007109598-03

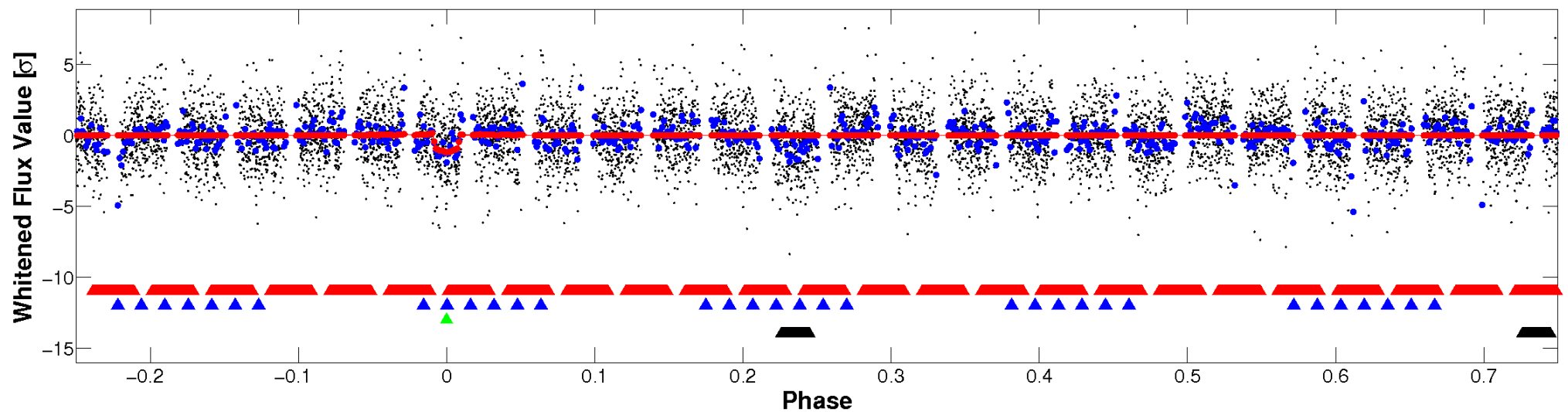


Non-Whitened Vs. Whitened Light Curve

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

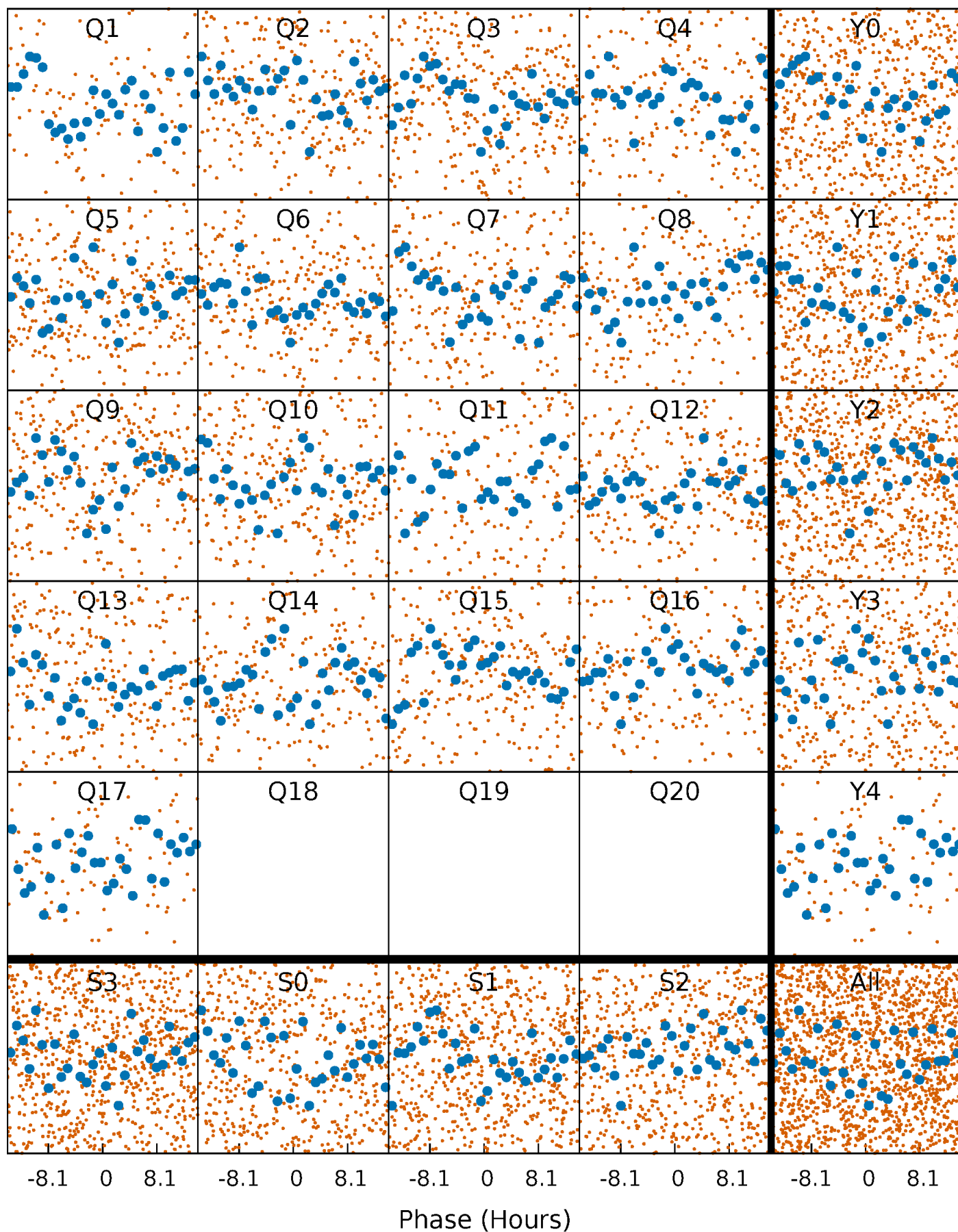


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



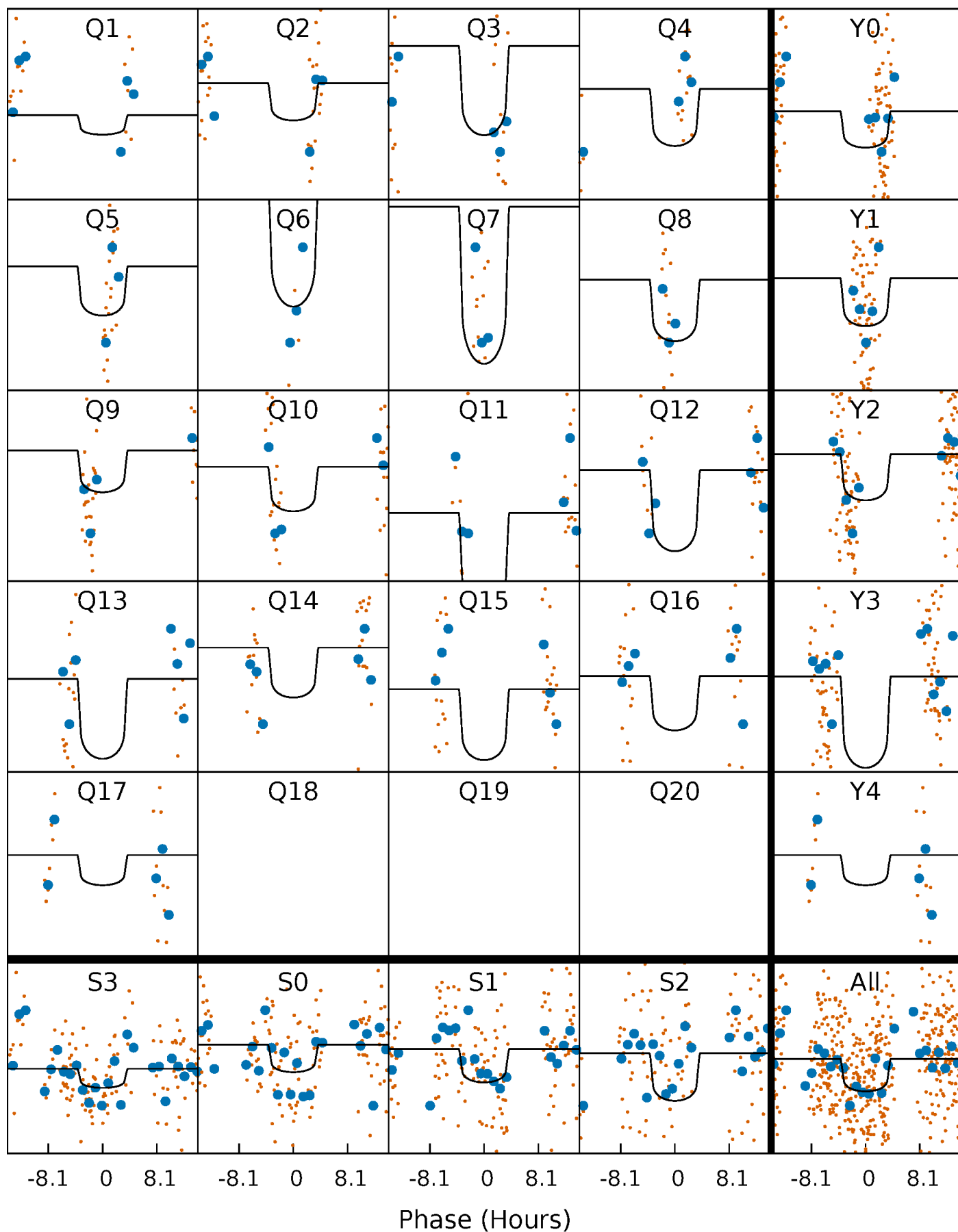
PDC Quarter-Phased Transit Curves

TCE 007109598-03 P= 17.131766 Days $T_0=142.054228$ (BKJD)



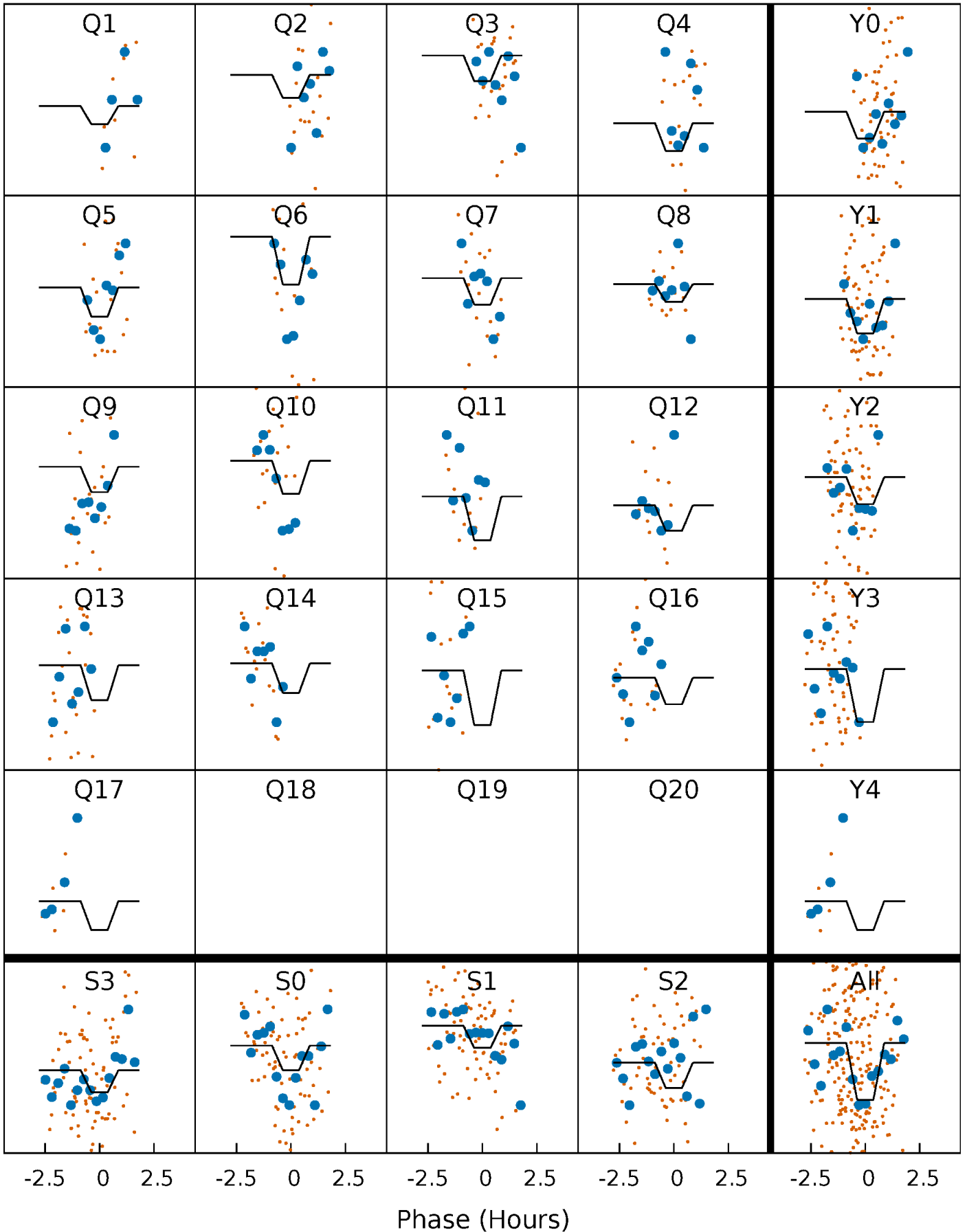
DV Quarter-Phased Transit Curves

TCE 007109598-03 P= 17.131766 Days $T_0=142.054228$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

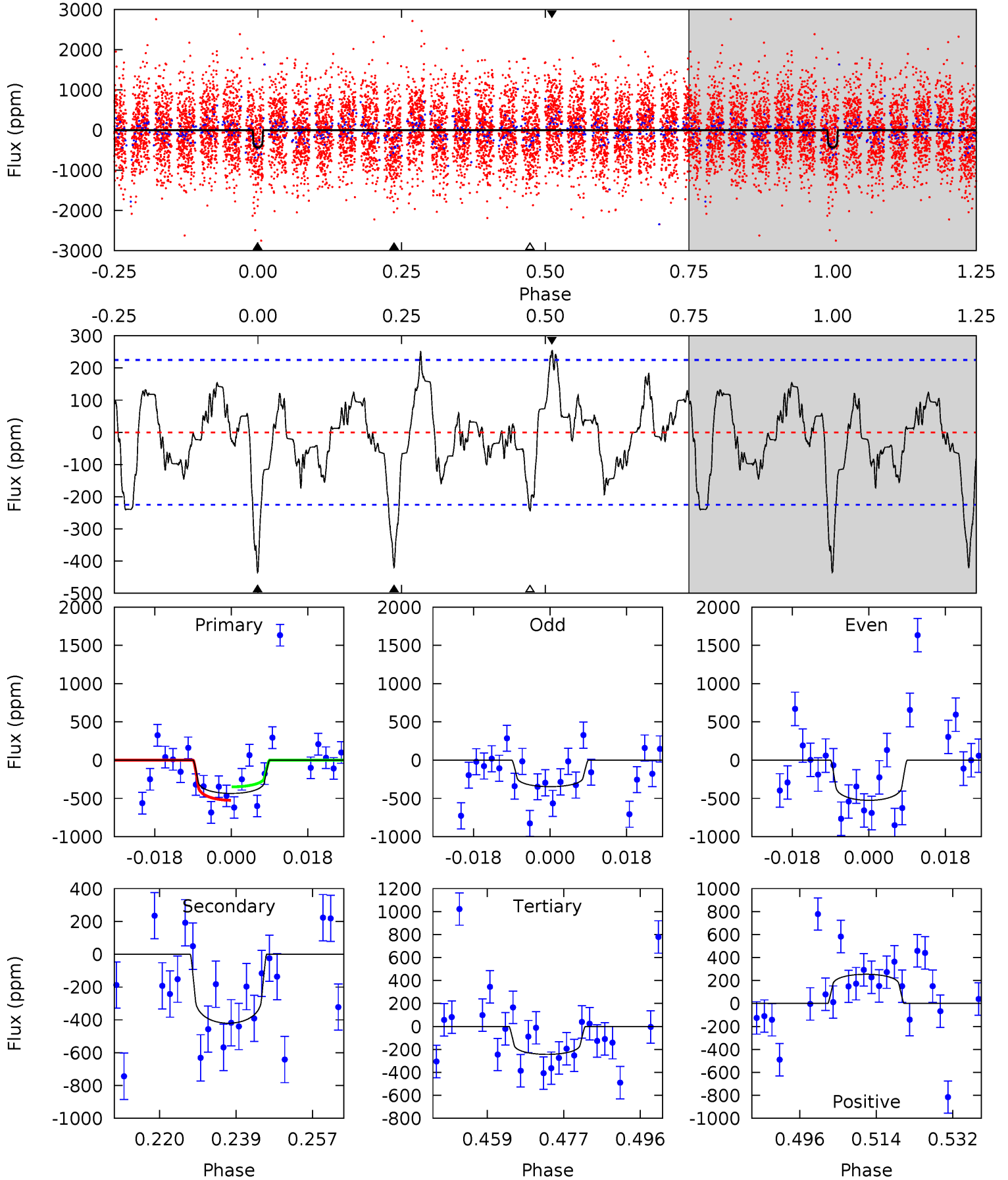
TCE 007109598-03 P= 17.127418 Days $T_0=142.170331$ (BKJD)



DV Model-Shift Uniqueness Test

007109598-03, P = 17.131766 Days, E = 124.922462 Days

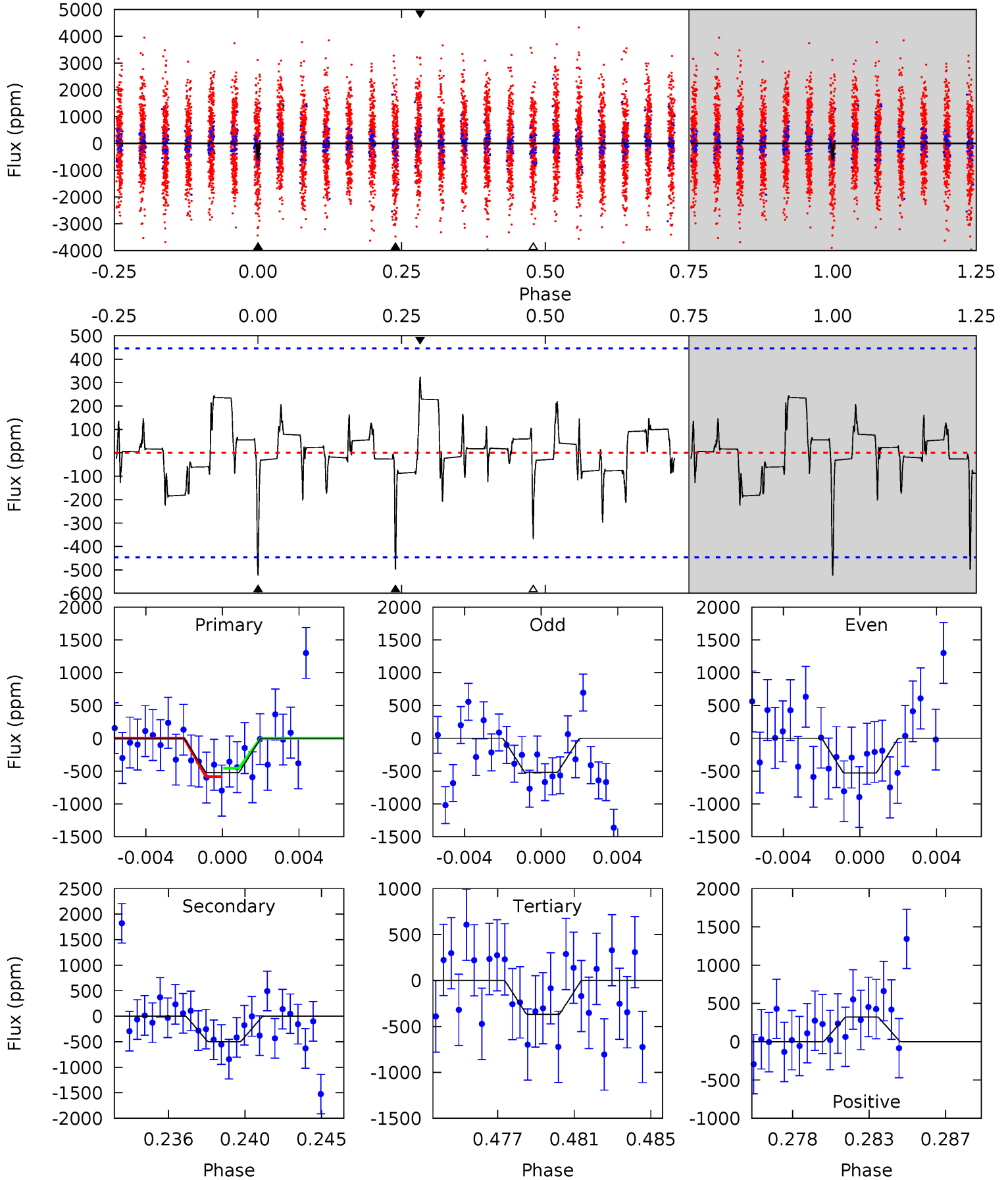
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.49	9.18	5.31	5.55	4.91	2.36	2.12	4.18	3.95	3.87	3.63	1.96	1.31	0.37	1.92



Alt Model-Shift Uniqueness Test

007109598-03, $P = 17.127418$ Days, $E = 125.042913$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.09	5.79	4.28	3.74	5.19	2.86	1.32	1.81	2.35	1.50	2.05	0.06	1.00	0.38	0.74



Stellar Parameters For KIC 007109598

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	7182^{+71}_{-93}	$3.979^{+0.121}_{-0.099}$	$0.360^{+0.050}_{-0.150}$	$2.300^{+0.368}_{-0.368}$	$1.838^{+0.116}_{-0.154}$	$0.213^{+0.122}_{-0.072}$
	+1%/-1%	+3%/-2%	+14%/-42%	+16%/-16%	+6%/-8%	+57%/-34%
Source	SPE68	SPE68	SPE68	DSEP		

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

Secondary Eclipse Parameters for KIC 007109598-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-420 ± 46	$8.43^{+7.51}_{-5.70}$	1675^{+72}_{-72}	5529^{+5294}_{-1302}	82^{+711}_{-59}
Alt.	-498 ± 86	$8.90^{+7.75}_{-5.98}$	1679^{+69}_{-66}	5655^{+5168}_{-1308}	88^{+731}_{-64}

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 $A_{obs} \gg 1.0$

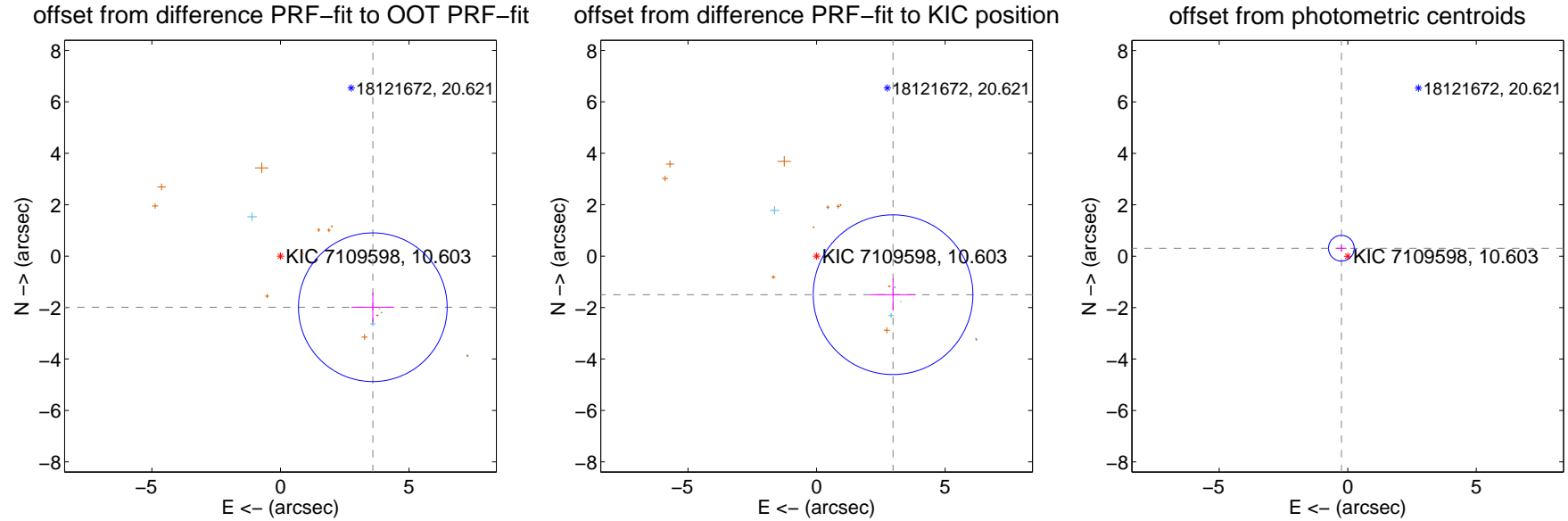
DV Centroid Data

Supplemental centroid analysis for 007109598-03. **Kepler magnitude: 10.60.** Transit SNR 13.99

There are 4 quarters with good PRF difference image offsets

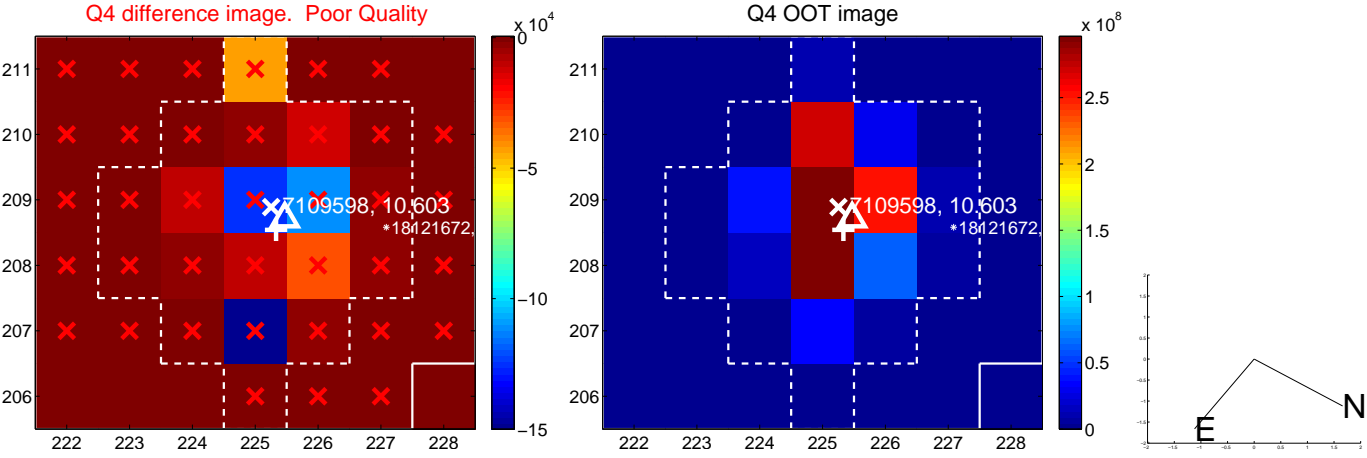
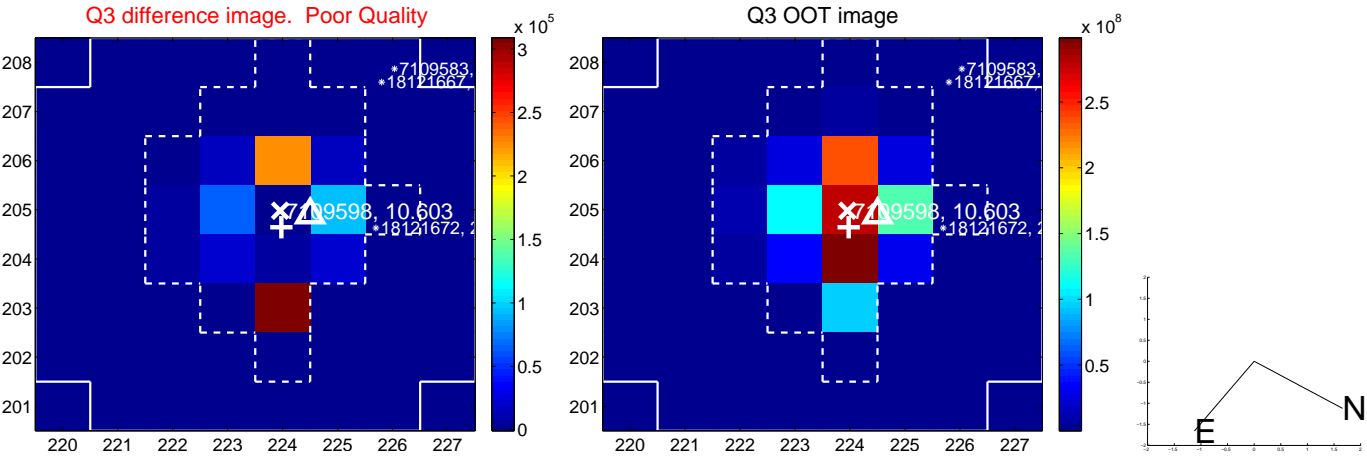
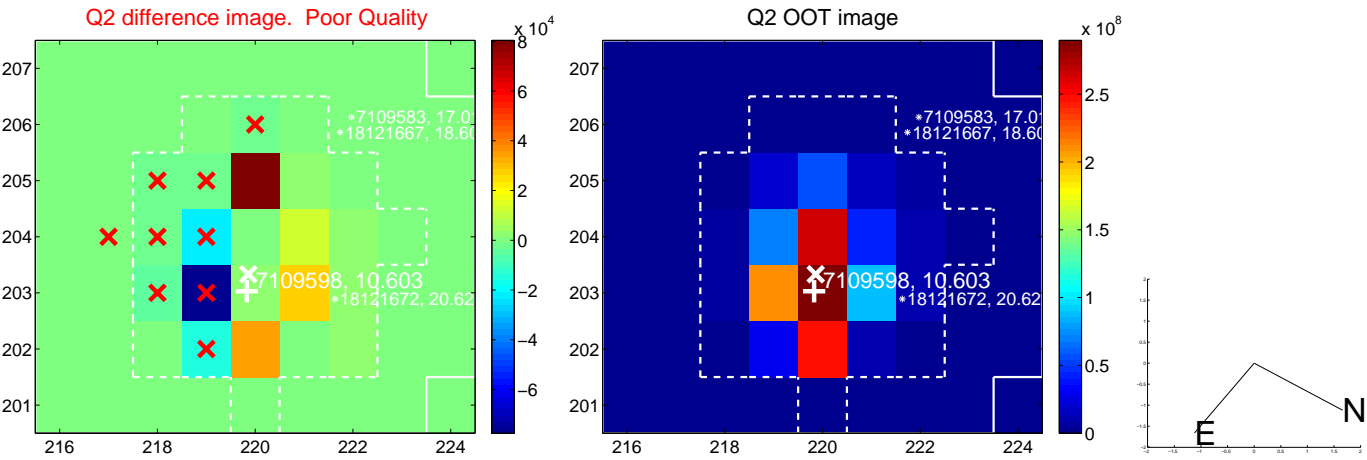
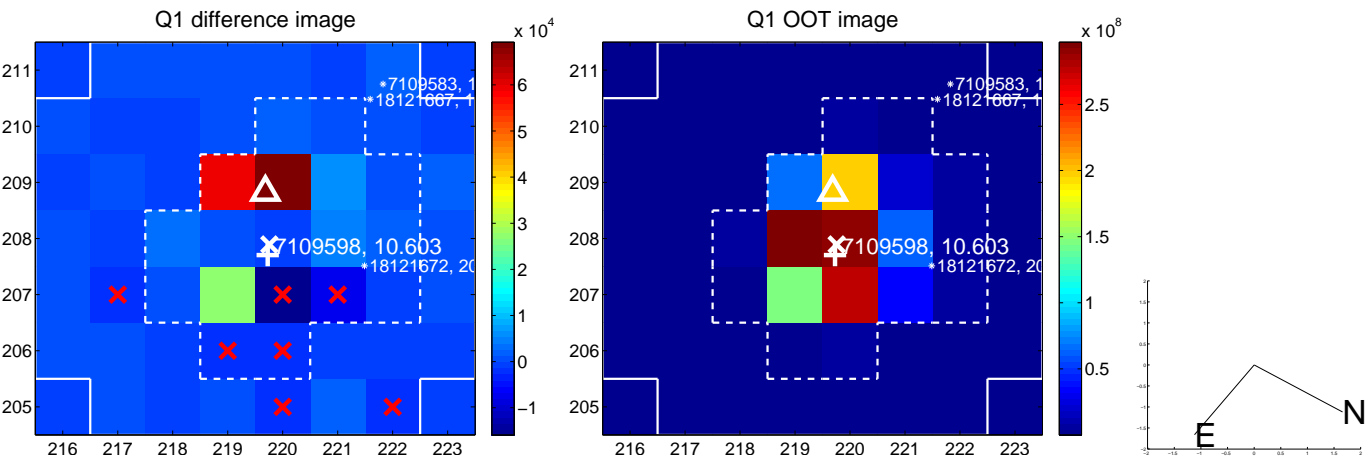
The direct PRF centroid is offset from the target star catalog position by about 0.59 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	4.105 ± 0.964	4.26	-3.592 ± 0.828	-1.988 ± 0.572
PRF-fit source offset from KIC position	3.331 ± 1.035	3.22	-2.974 ± 0.886	-1.499 ± 0.621
photometric centroid source offset	0.40 ± 0.17	2.38	0.25 ± 0.20	0.31 ± 0.14

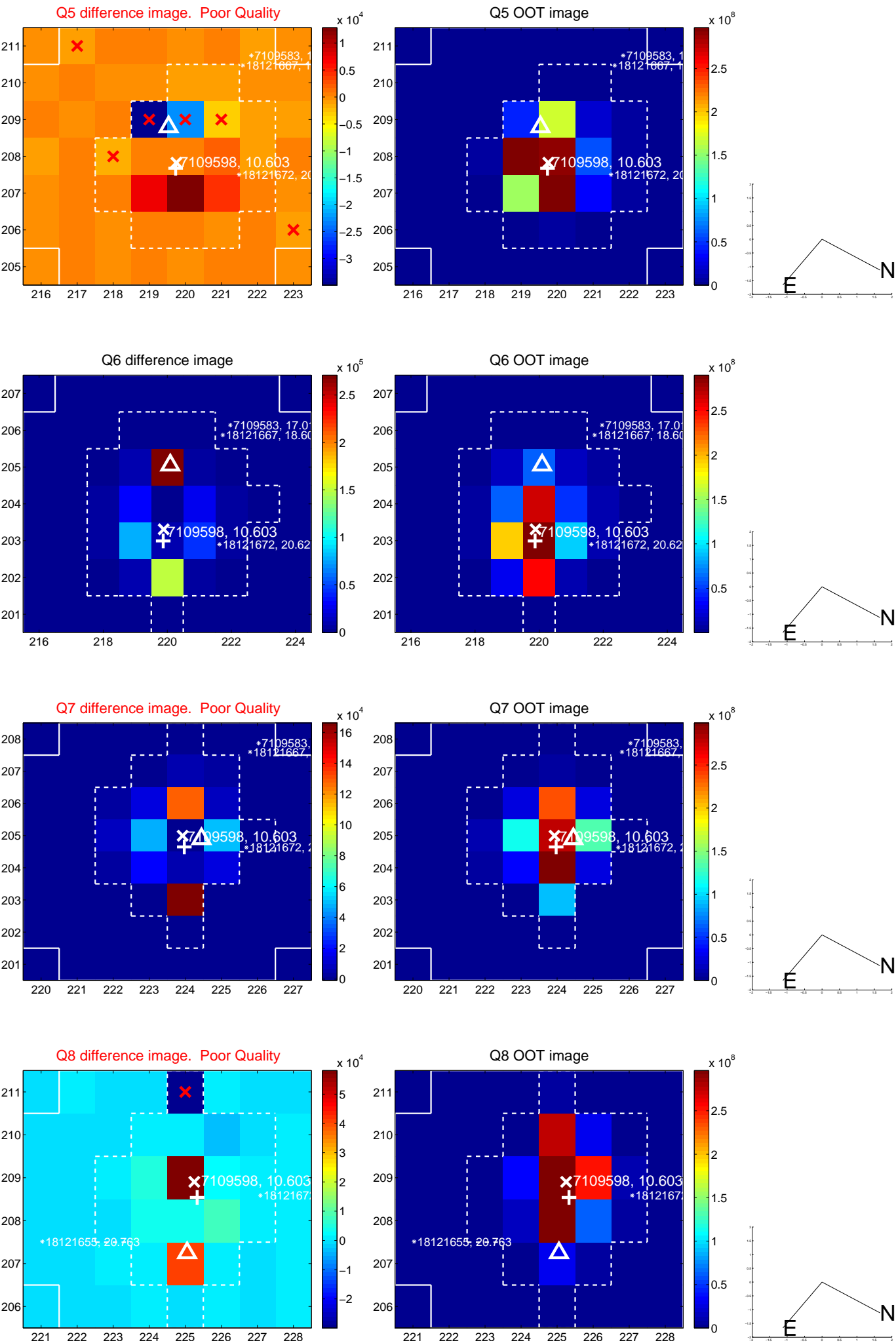


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

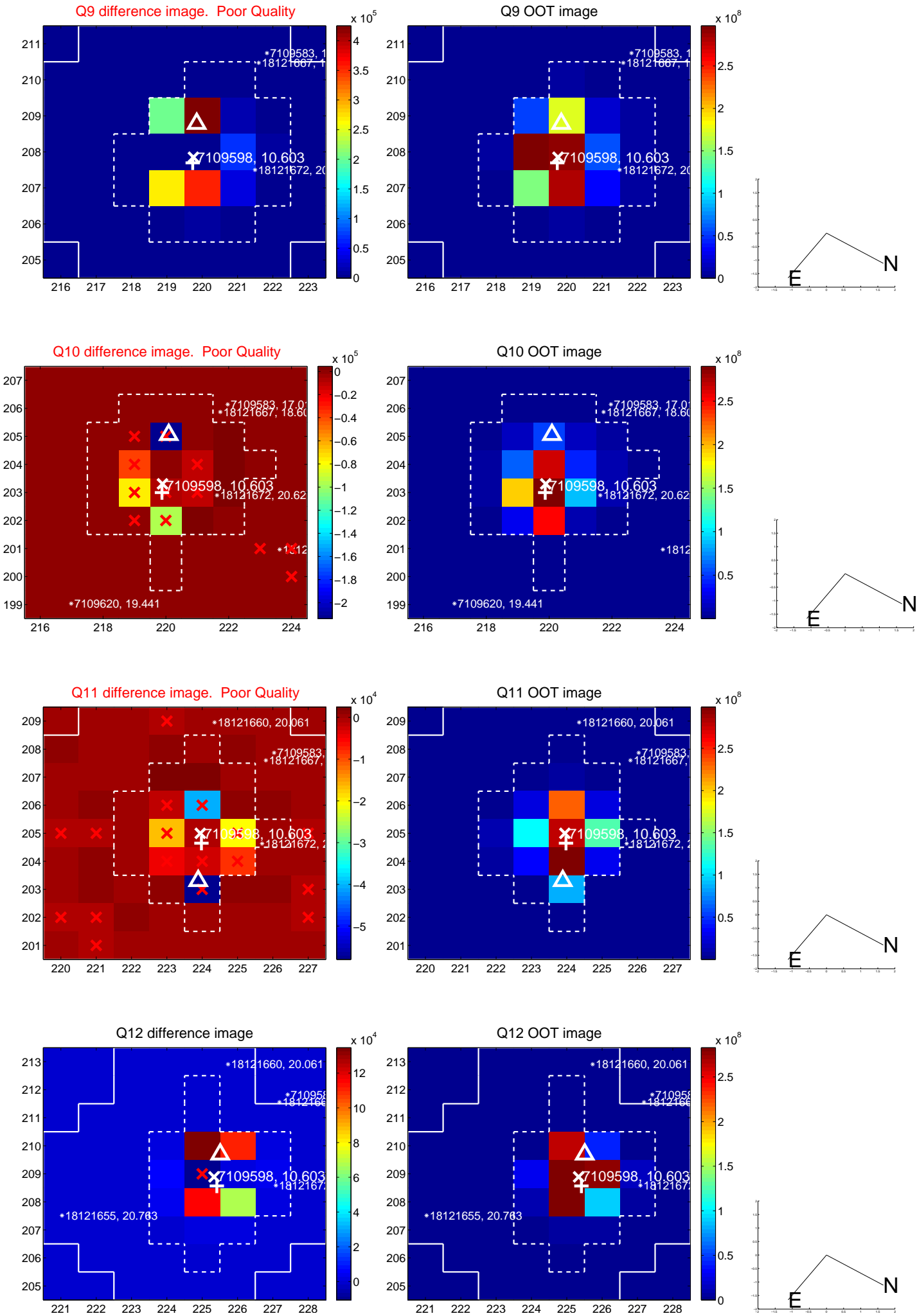
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



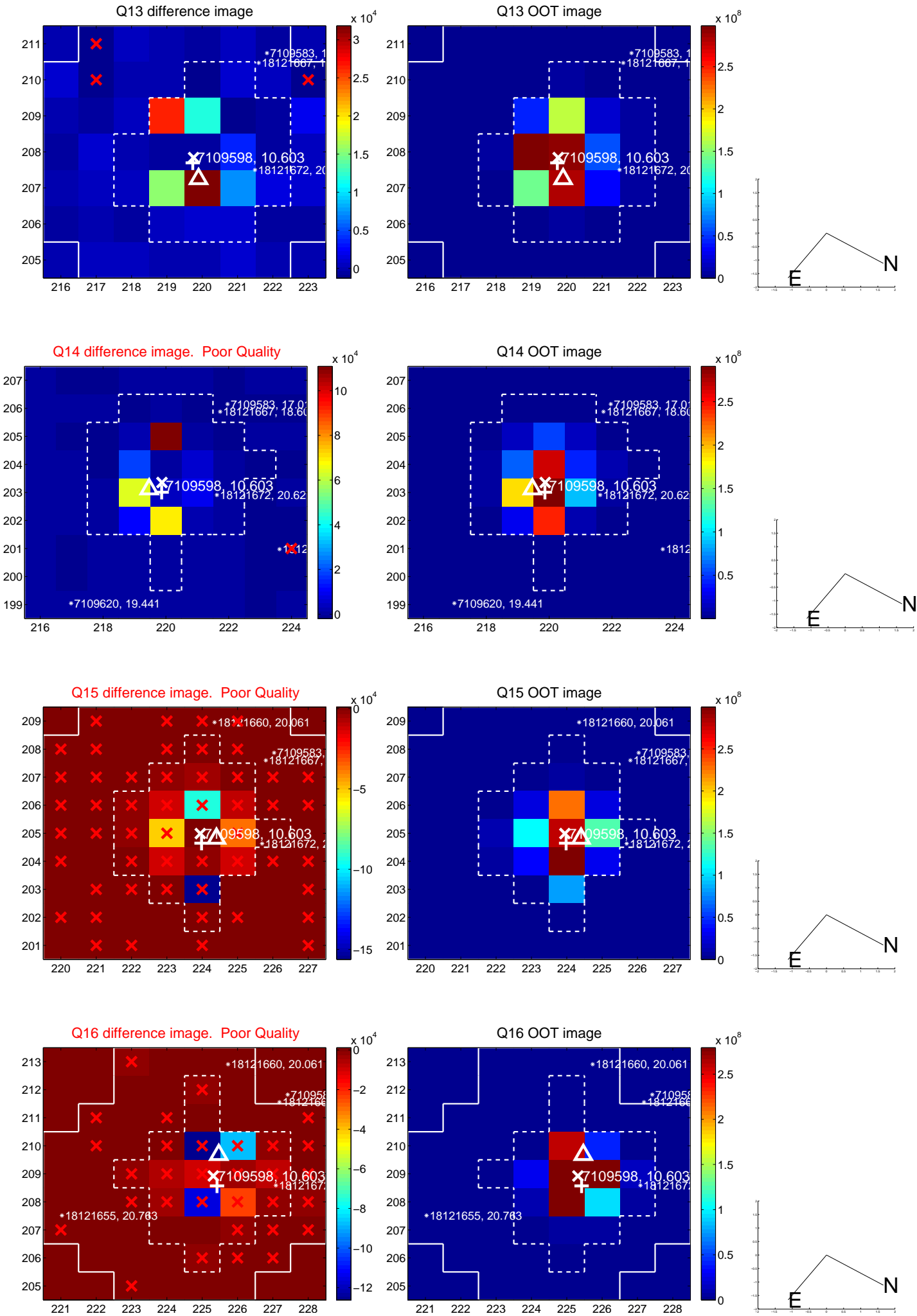
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



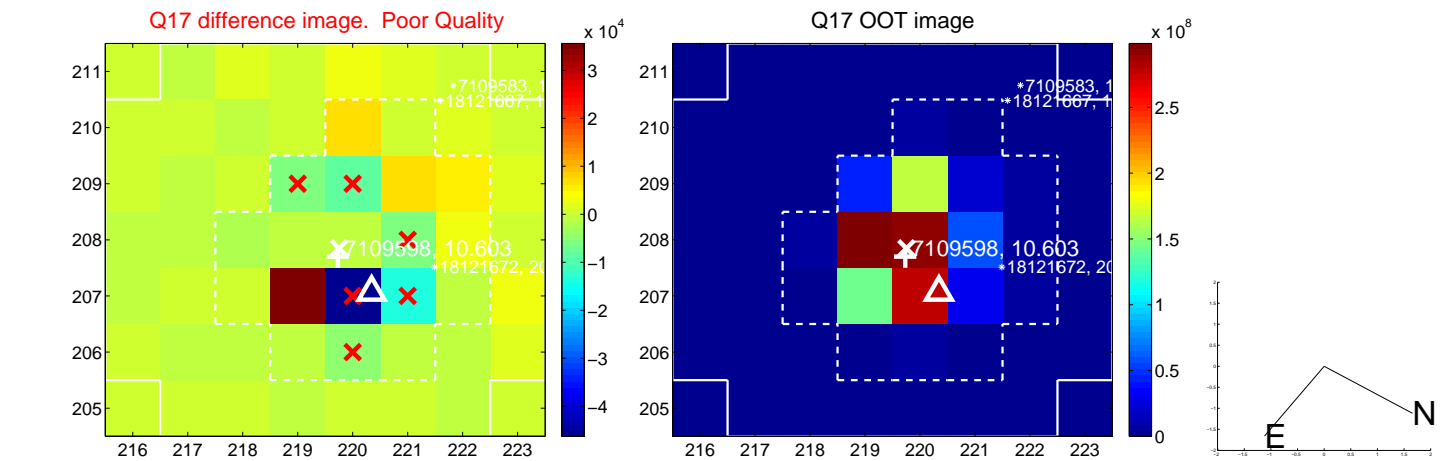
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



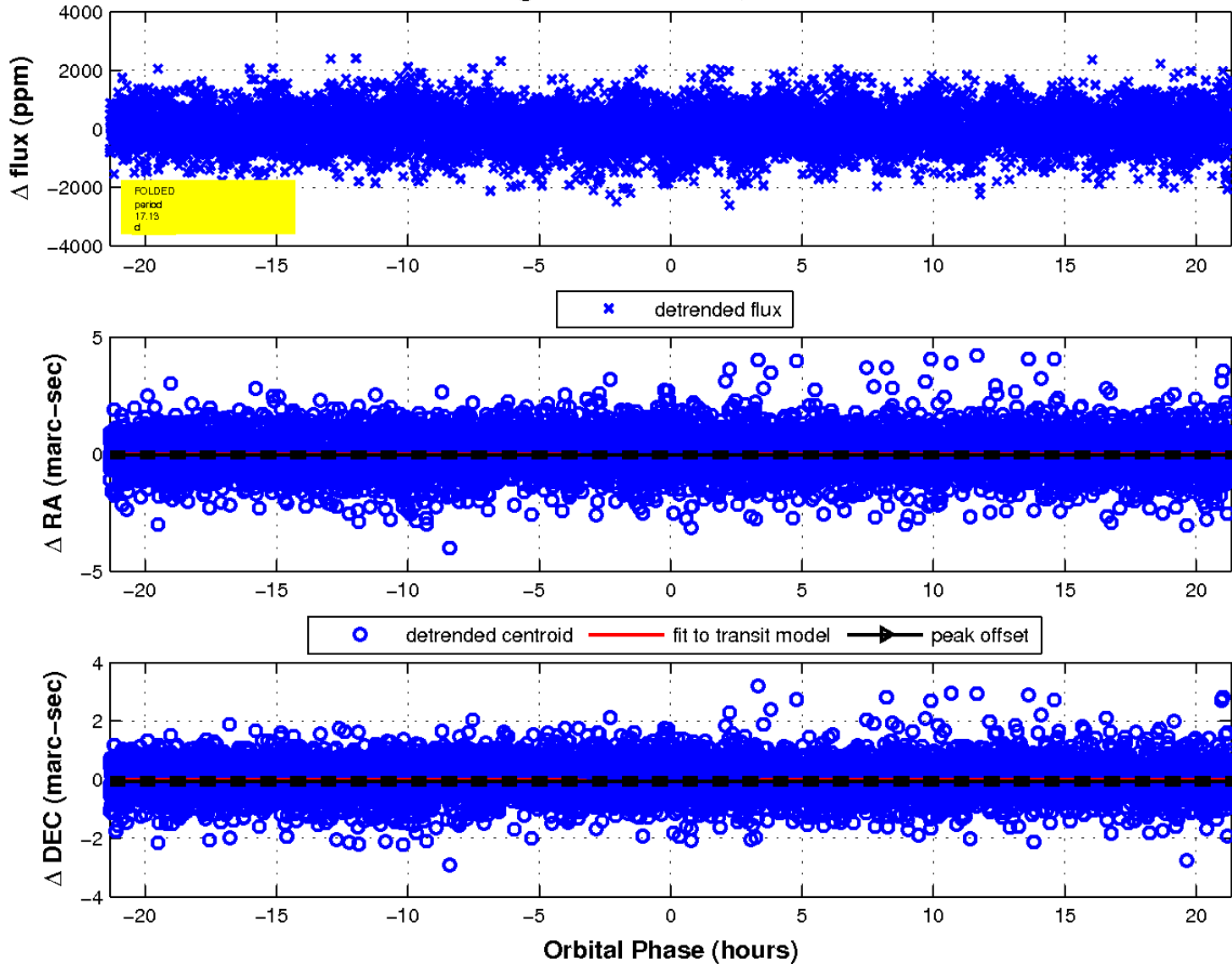
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

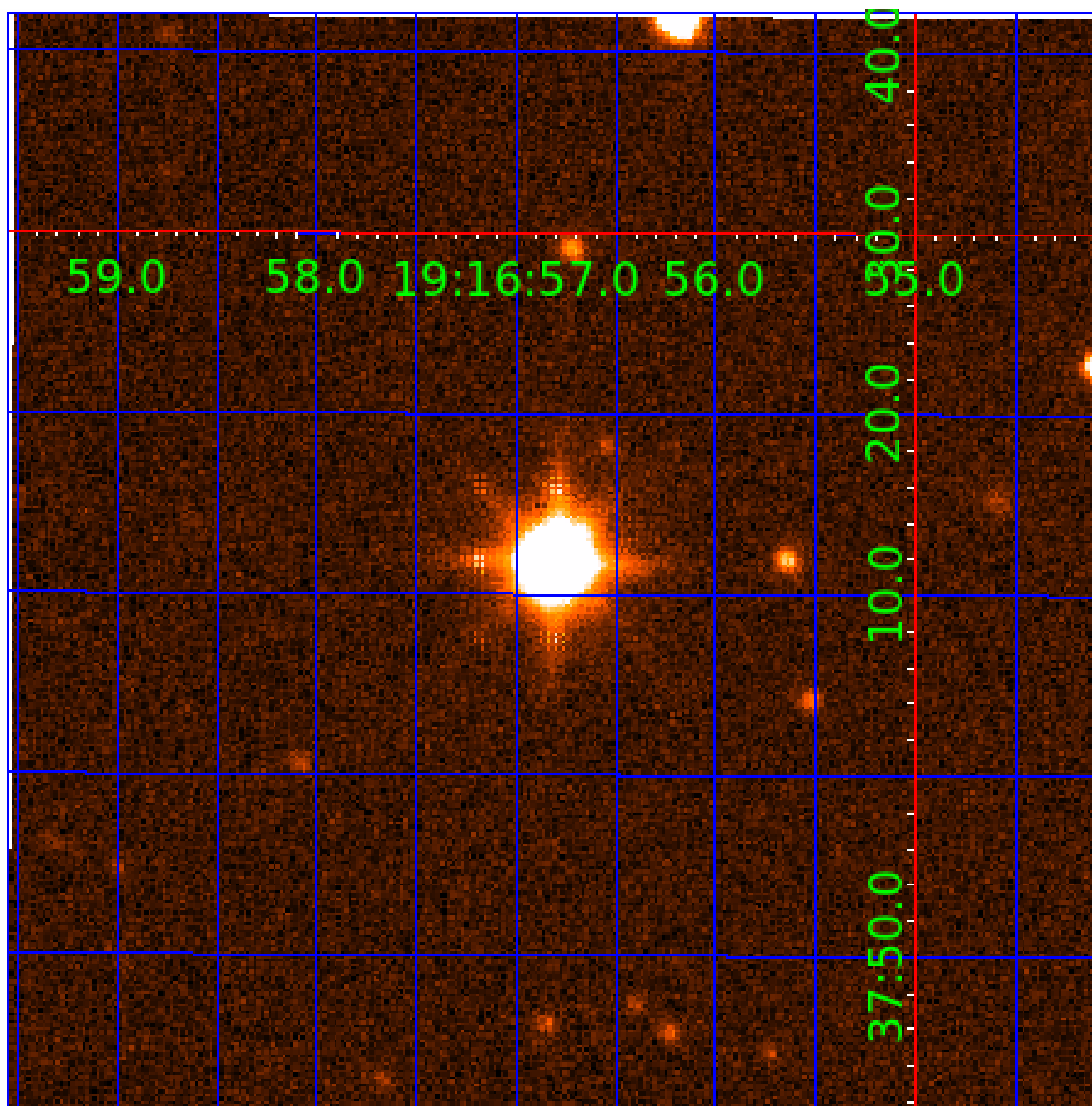


fluxWeightedCentroids, Planet 3 of 4



UKIRT Image

Declination



KIC 007109598

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})
007109598-01	OBS	No	0.685040	131.592712	72.6	4.622	13.9	11.1	2.30	7182	1.99	36313.93
007109598-02	OBS	No	44.596854	134.718716	2015.5	1.095	19.5	14.0	2.30	7182	10.53	138.66
007109598-03	OBS	No	17.131766	142.054228	474.4	7.117	14.4	14.0	2.30	7182	5.10	496.55
007109598-04	OBS	No	8.563904	137.688683	656.3	1.261	13.0	15.3	2.30	7182	6.95	1251.60

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007109598-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_SATURATED
007109598-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED—HALO_GHOST
007109598-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_SATURATED
007109598-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

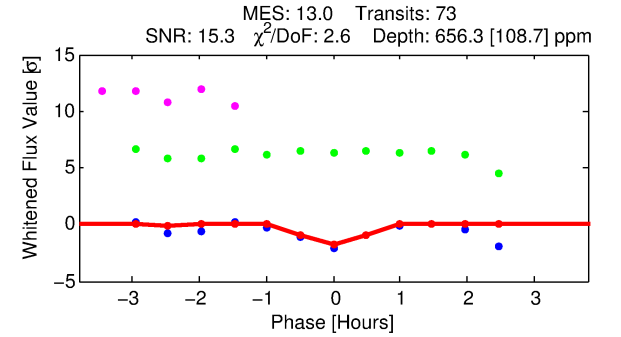
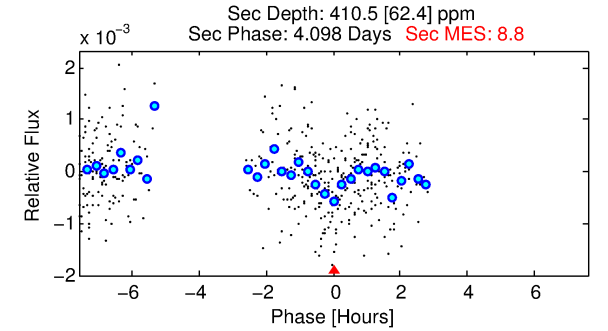
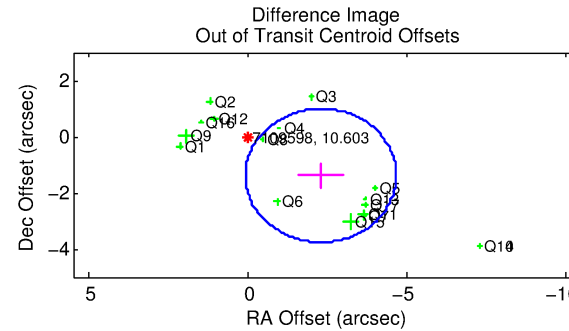
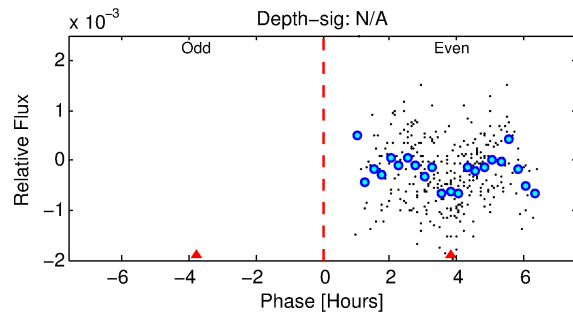
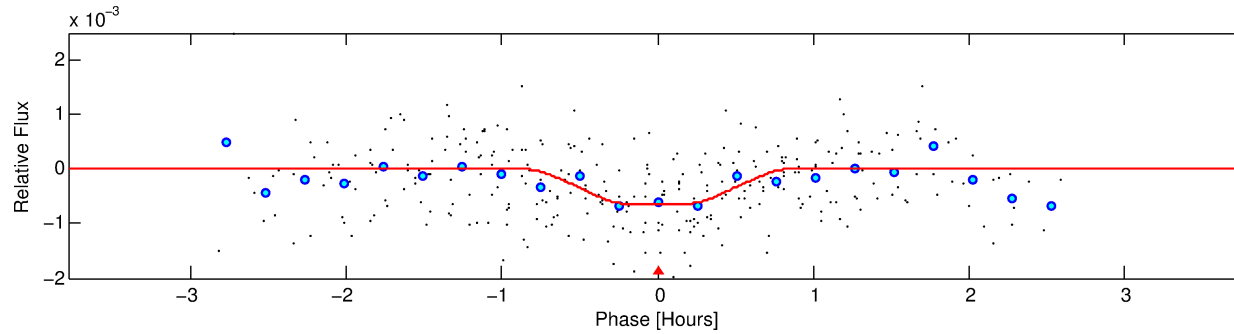
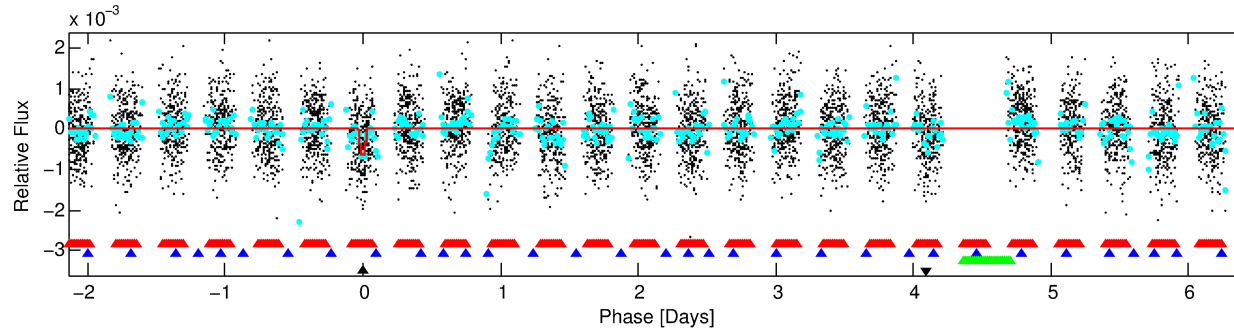
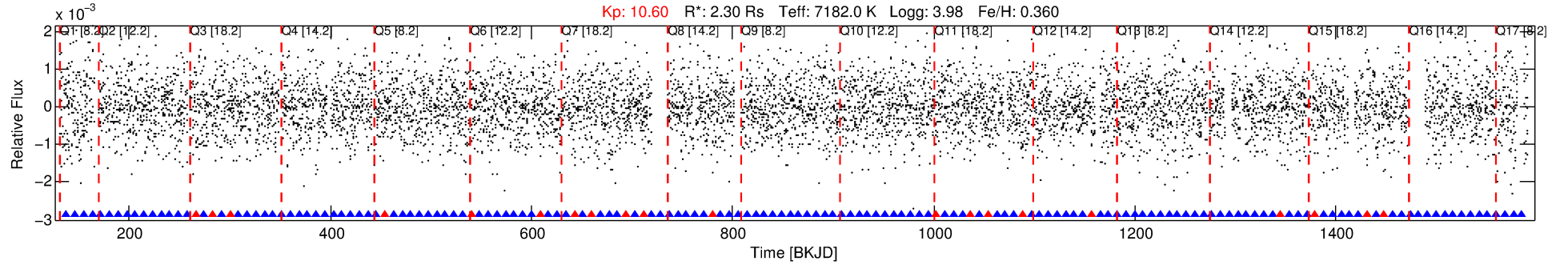
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007109598-04

No Significant Match Found

DV One-Page Summary

KIC: 7109598 Candidate: 4 of 4 Period: 8.564 d



DV Fit Results:

Period = 8.56390 [0.00008] d
 Epoch = 137.6887 [0.0058] BKJD
 Rp/R* = 0.0277 [0.0121]
 a/R* = 24.59 [60.91]
 b = 0.91 [0.46]
 Seff = 1251.60 [275.81]
 Teq = 1517 [84] K
 Rp = 6.95 [3.23] Re
 a = 0.1004 [0.0142] AU
 Ag = 47.16 [42.97] [1.07σ]
 Teffp = 6145 [1363] K [3.39σ]

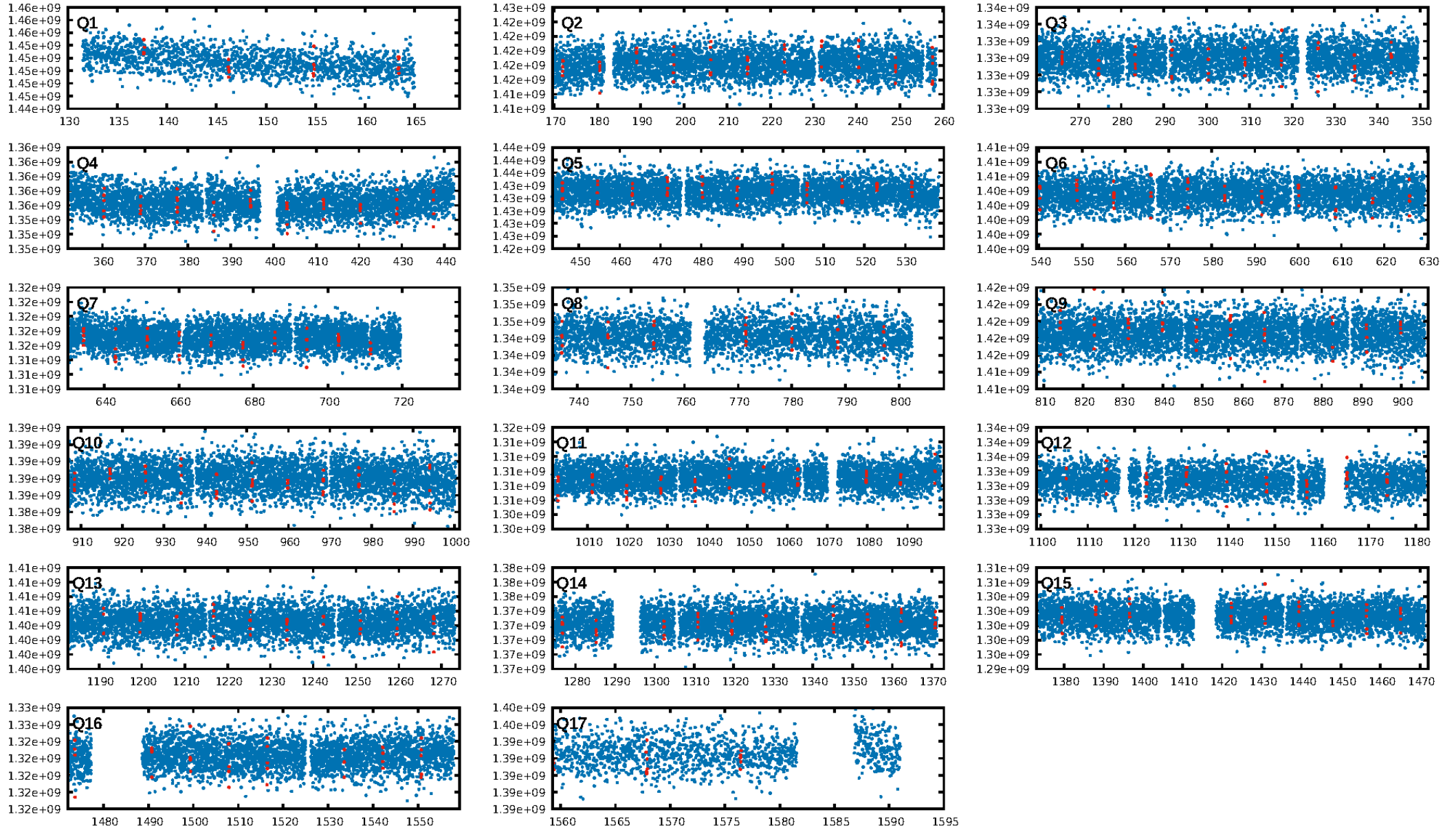
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [39.47σ]
 LongPeriod-sig: 100.0% [28.45σ]
 ModelChiSquare2-sig: 0.0%
 ModelChiSquareGof-sig: 24.7%
 Bootstrap-pfa: 8.62e-13
 RollingBand-fgt: 0.72 [51/71]
 GhostDiagnostic-chr: 0.9187
 Centroid-sig: 64.7%
 Centroid-so: 0.156 arcsec [1.05σ]
 OotOffset-rm: 2.677 arcsec [3.38σ]
 OotOffset-st: 4/4/4/5 [17]
 KicOffset-rm: 1.613 arcsec [2.09σ]
 KicOffset-st: 4/4/4/5 [17]
 DiffImageQuality-fgm: 0.29 [5/17]
 DiffImageOverlap-fno: 0.41 [7/17]

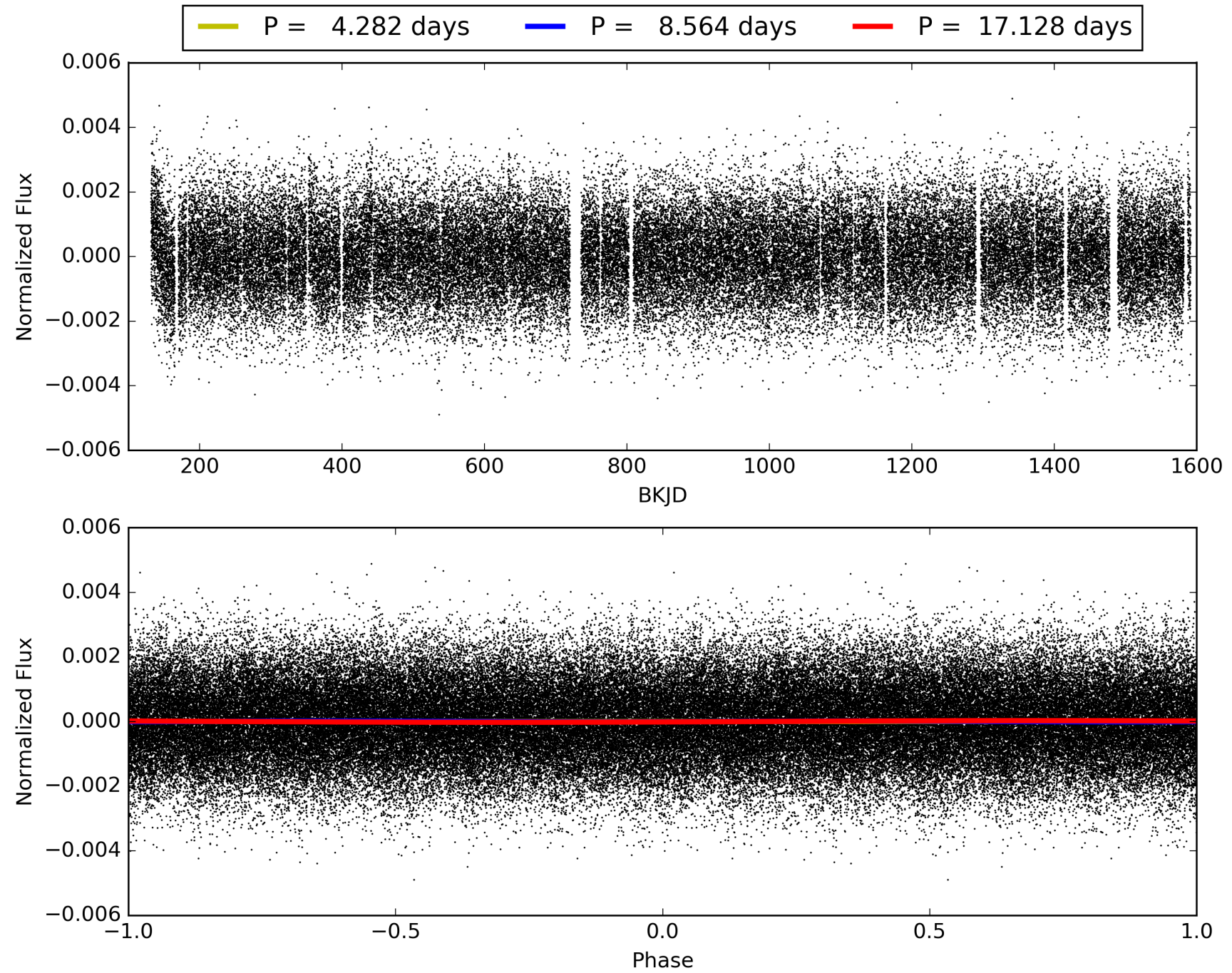
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:37:01 Z

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

TCE 007109598-04, PDC Light Curves

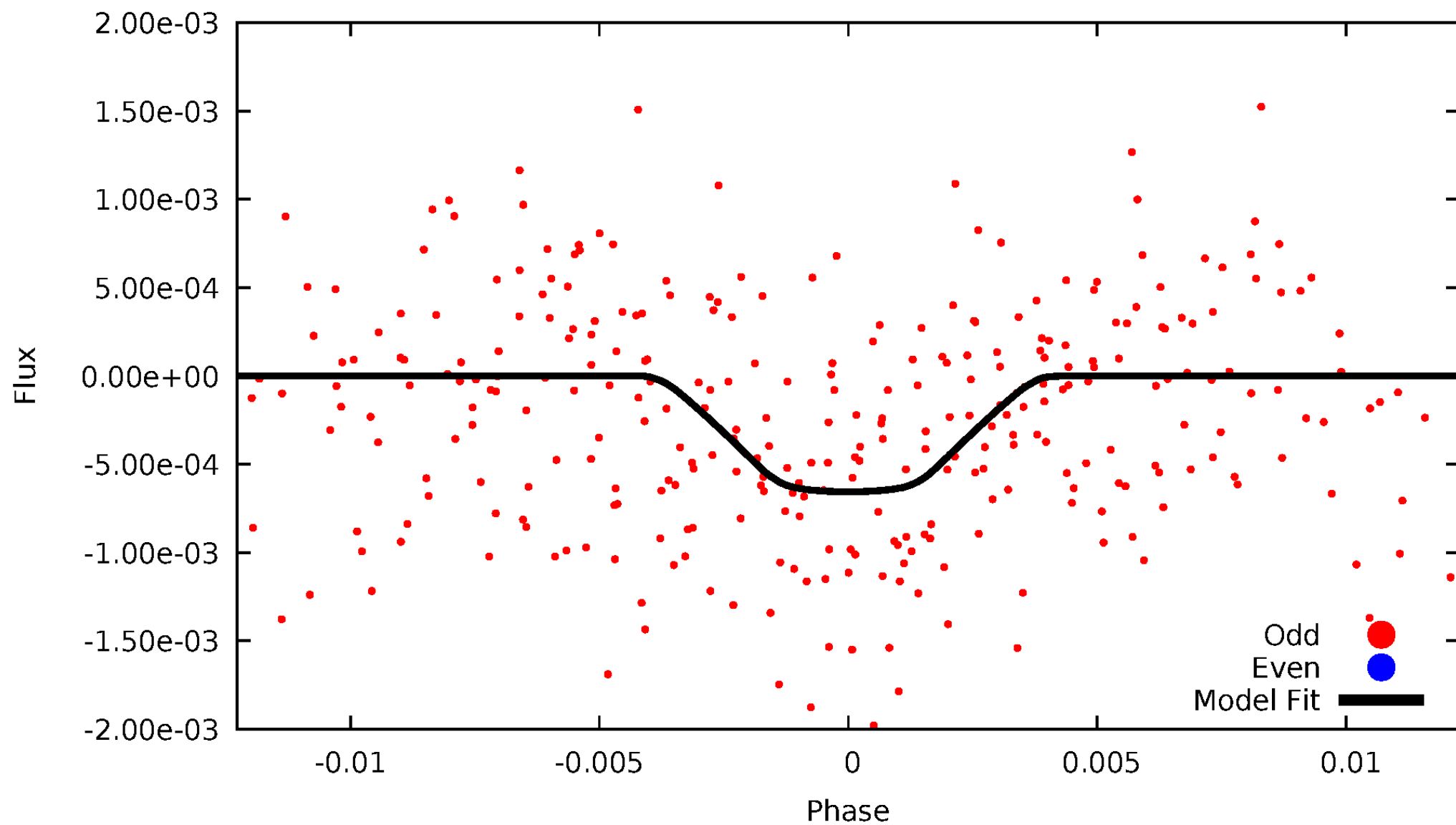


TCE 007109598-04



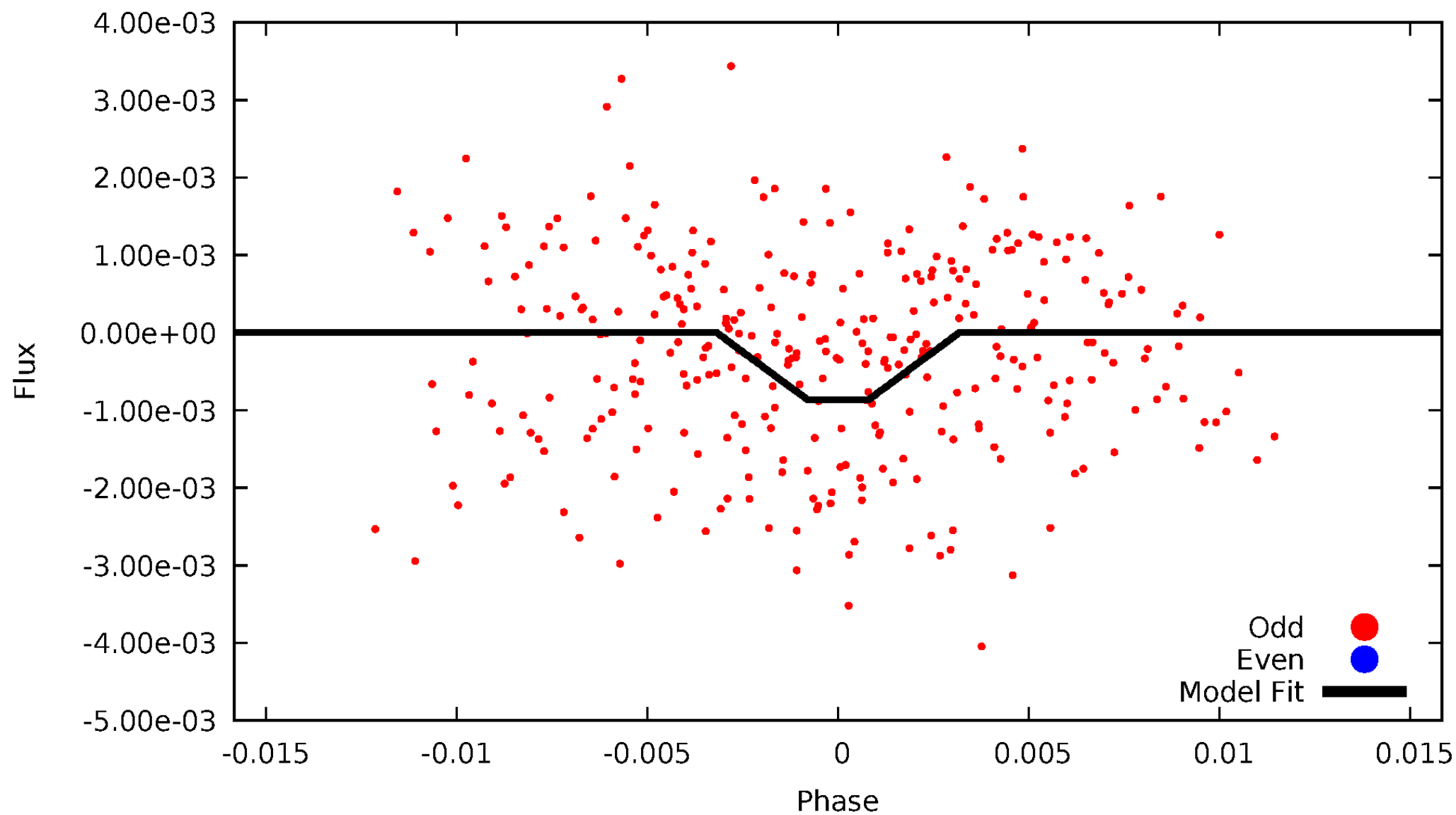
DV Odd/Even

TCE 007109598-04



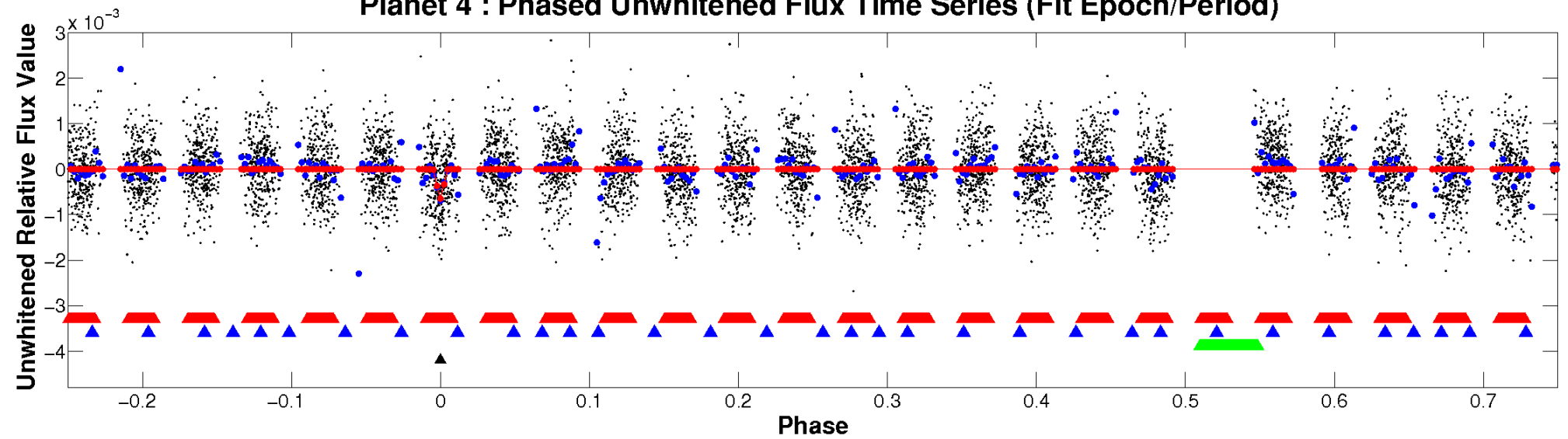
ALT Odd/Even

TCE 007109598-04

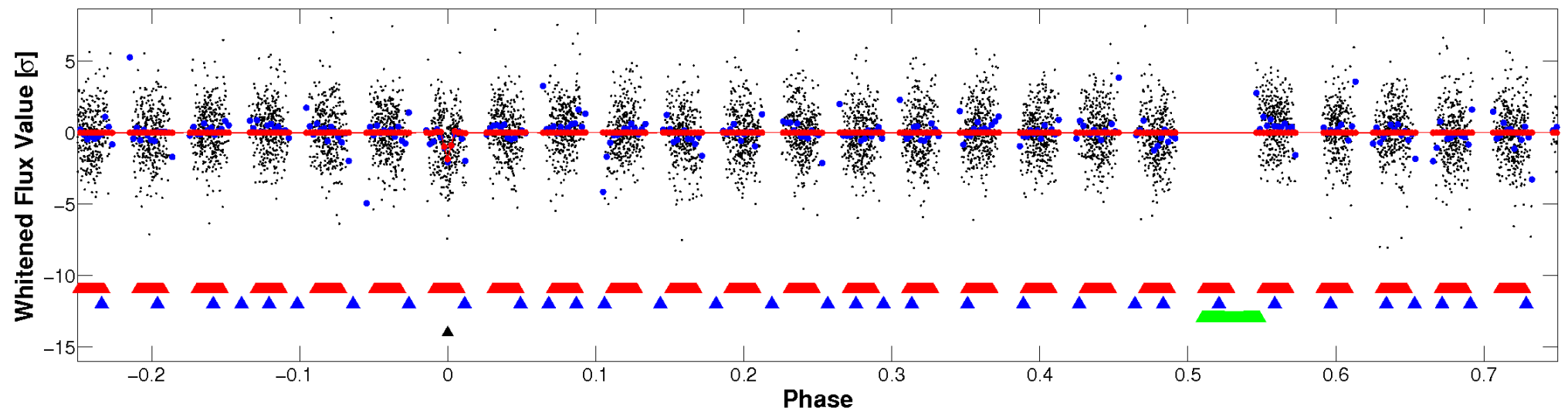


Non-Whitened Vs. Whitened Light Curve

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

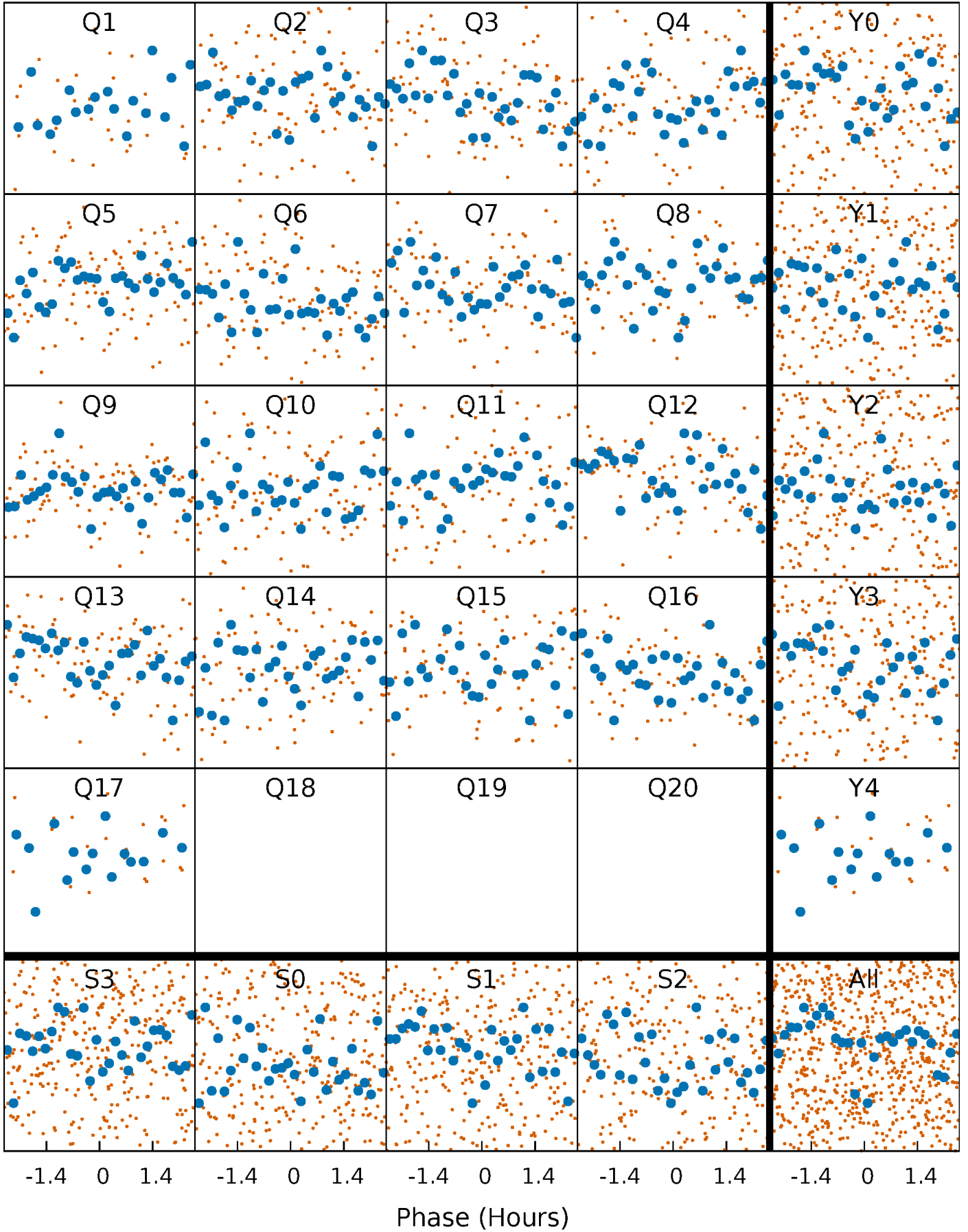


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



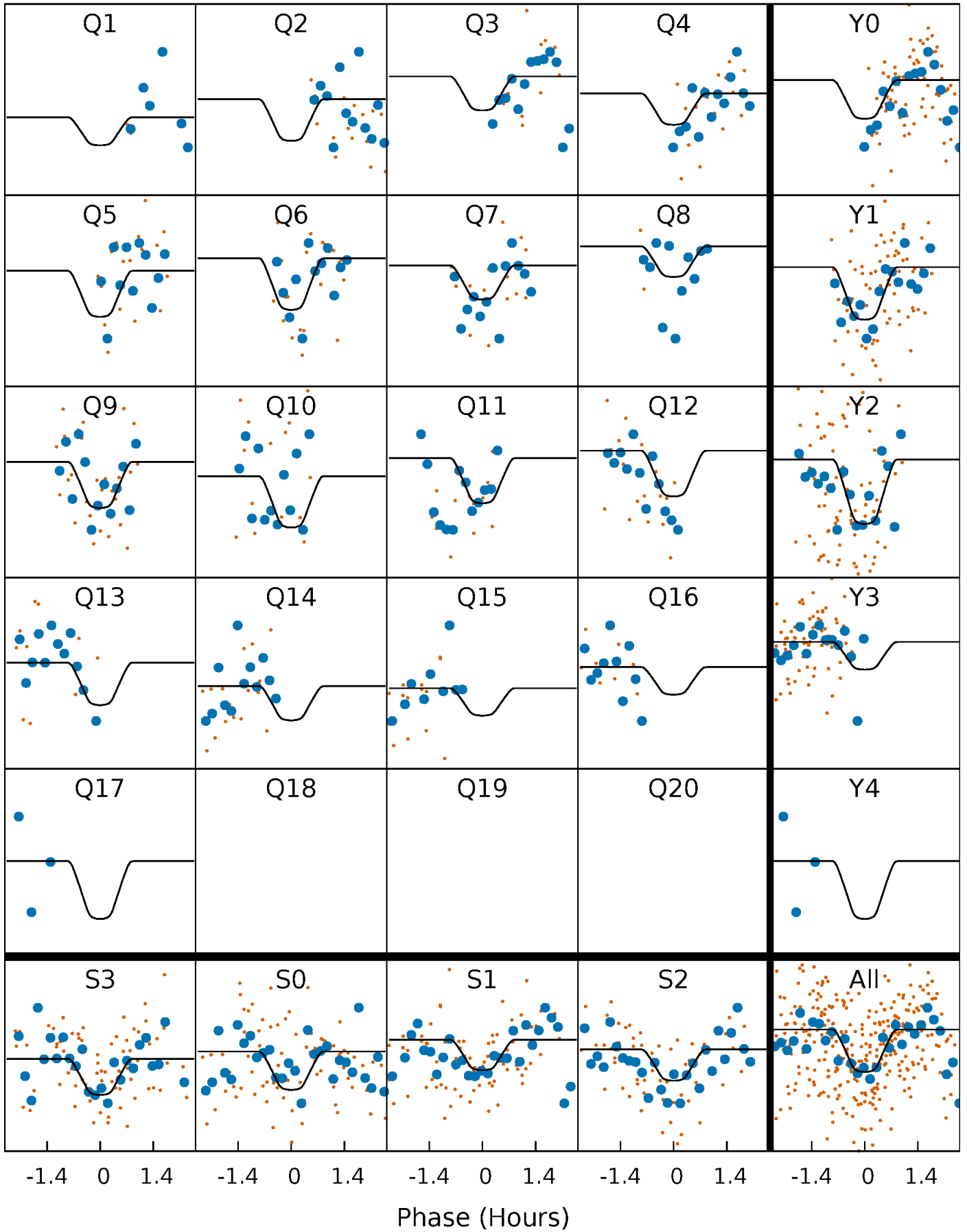
PDC Quarter-Phased Transit Curves

TCE 007109598-04 P= 8.563904 Days $T_0=137.688683$ (BKJD)



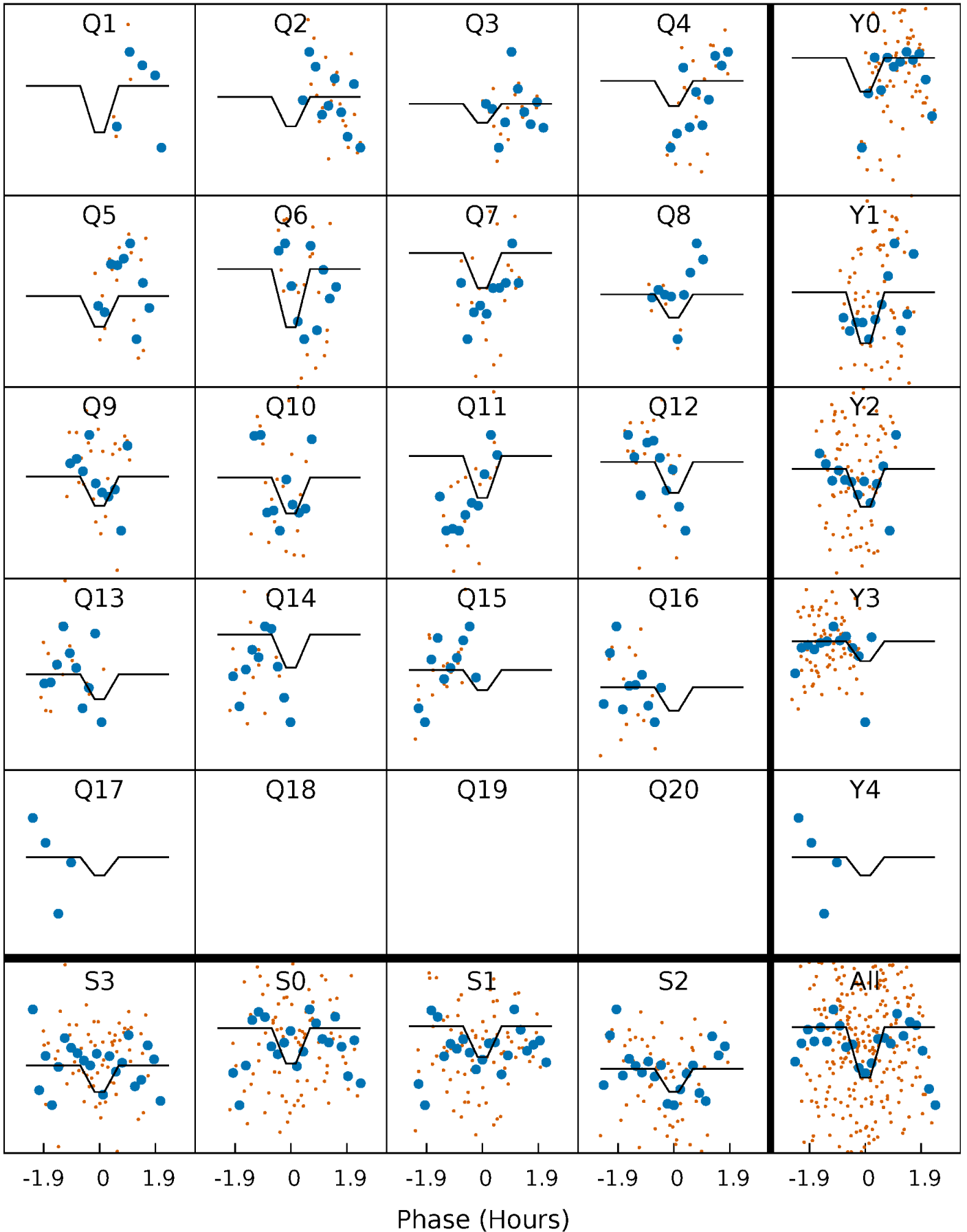
DV Quarter-Phased Transit Curves

TCE 007109598-04 P= 8.563904 Days $T_0=137.688683$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

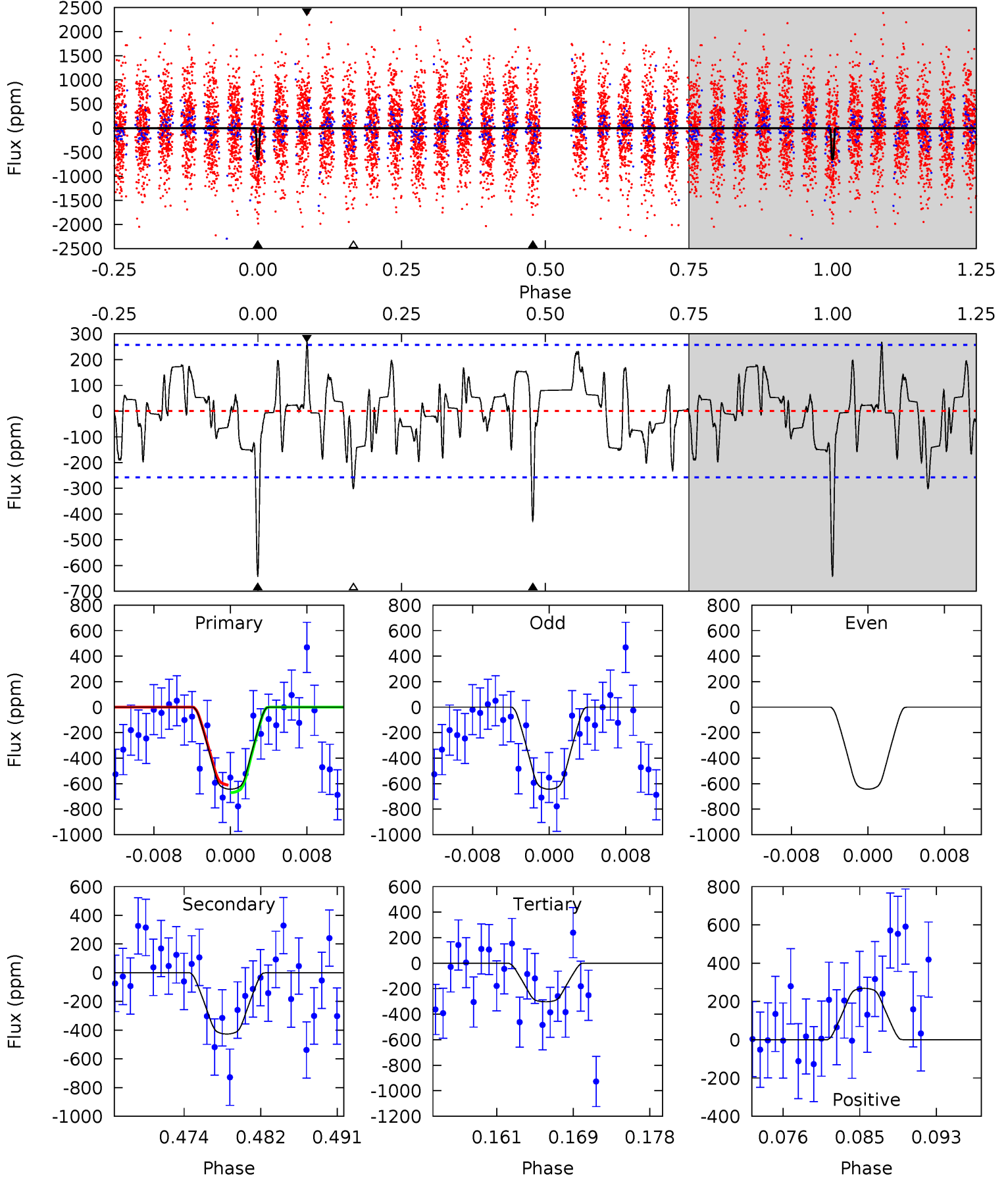
TCE 007109598-04 $P = 8.563754$ Days $T_0 = 137.699244$ (BKJD)



DV Model-Shift Uniqueness Test

007109598-04, P = 8.563904 Days, E = 129.124779 Days

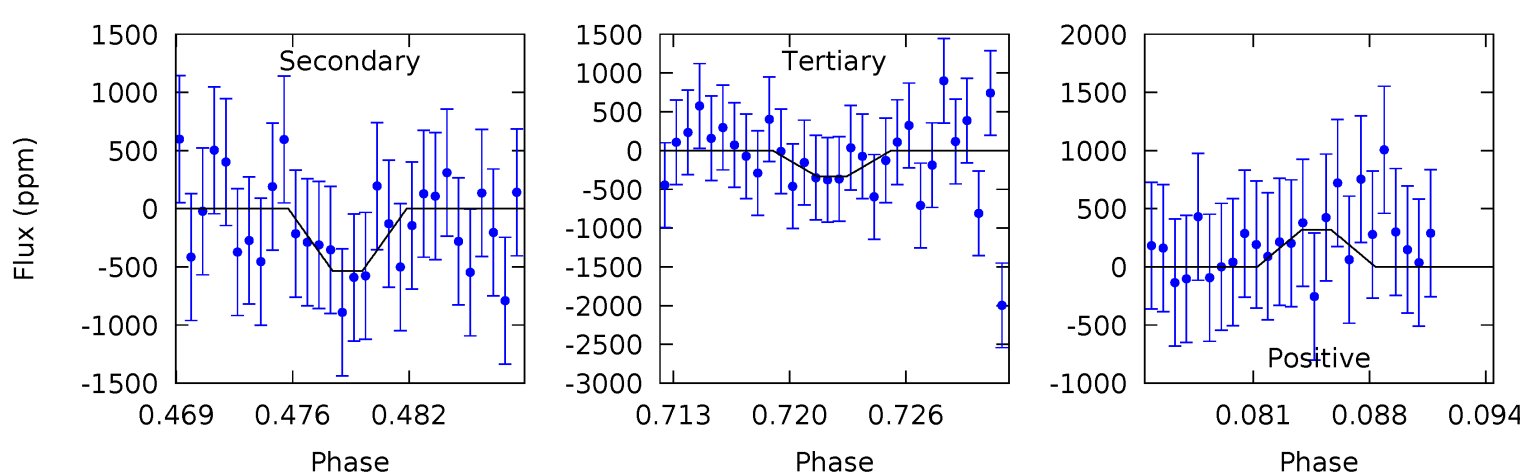
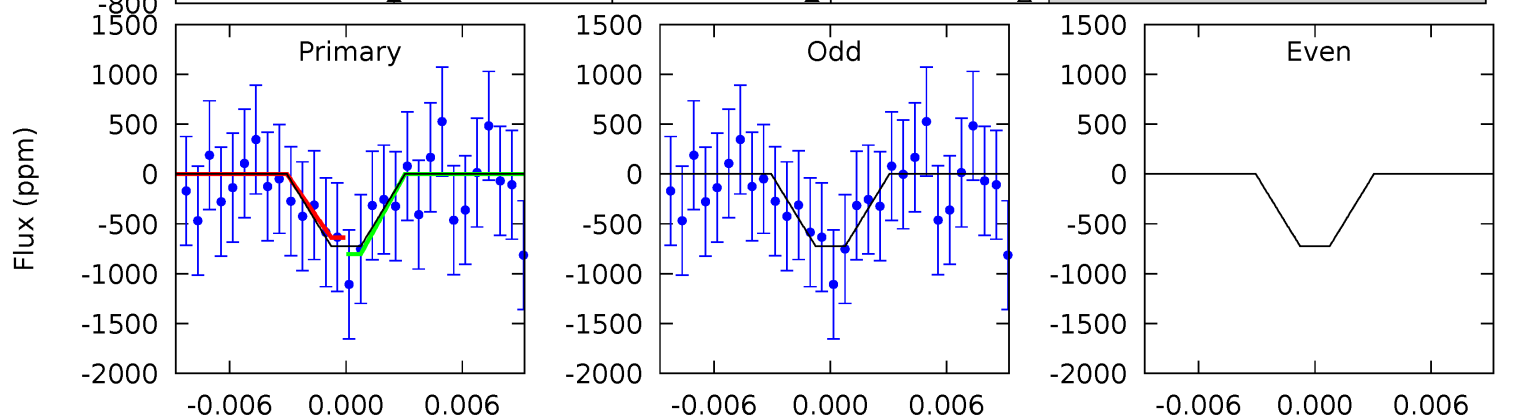
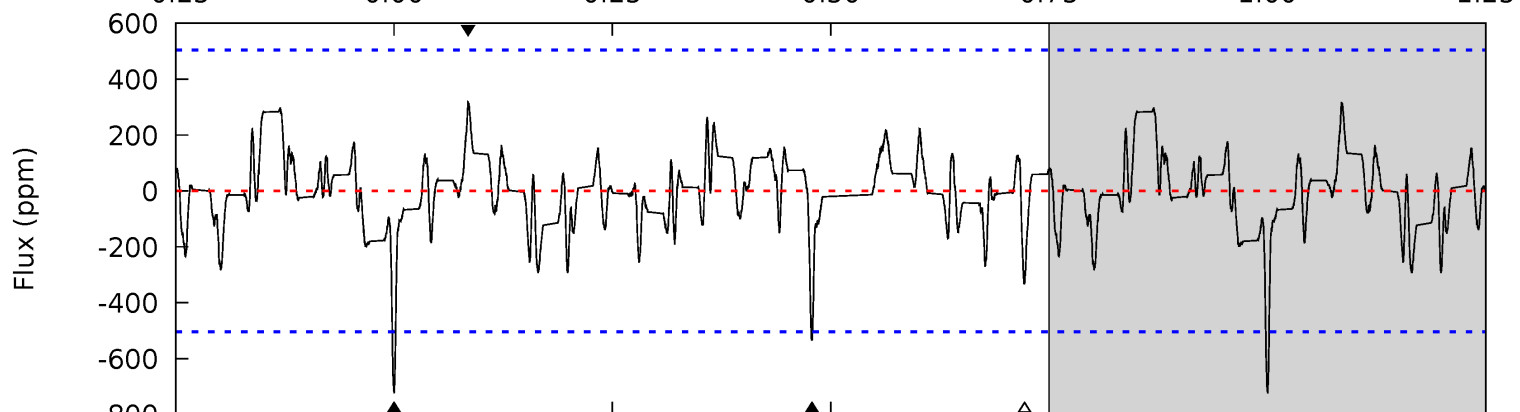
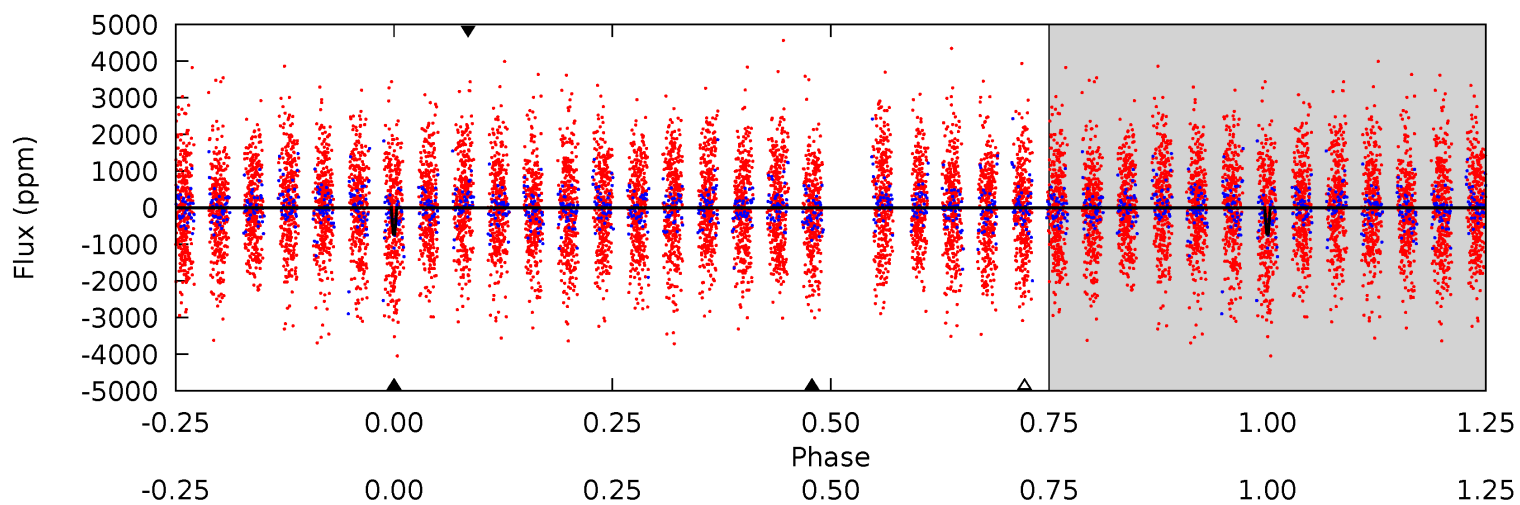
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.7	8.40	5.95	5.28	5.06	2.63	2.14	6.70	7.38	2.44	3.12	0	1.15	0.29	0.58



Alt Model-Shift Uniqueness Test

007109598-04, P = 8.563754 Days, E = 129.135490 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.35	5.44	3.39	3.23	5.12	2.73	1.28	3.97	4.12	2.05	2.21	0	1.03	0.31	0.84



Stellar Parameters For KIC 007109598

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7182^{+71}_{-93}	$3.979^{+0.121}_{-0.099}$	$0.360^{+0.050}_{-0.150}$	$2.300^{+0.368}_{-0.368}$	$1.838^{+0.116}_{-0.154}$	$0.213^{+0.122}_{-0.072}$
	+1%/-1%	+3%/-2%	+14%/-42%	+16%/-16%	+6%/-8%	+57%/-34%
Source	SPE68	SPE68	SPE68	DSEP		

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

Secondary Eclipse Parameters for KIC 007109598-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-427 ± 51	$6.59^{+3.10}_{-2.81}$	2117^{+88}_{-91}	6233^{+2302}_{-999}	54^{+106}_{-29}
Alt.	-536 ± 98	$7.13^{+3.01}_{-2.74}$	2110^{+86}_{-86}	6336^{+1927}_{-972}	58^{+91}_{-30}

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

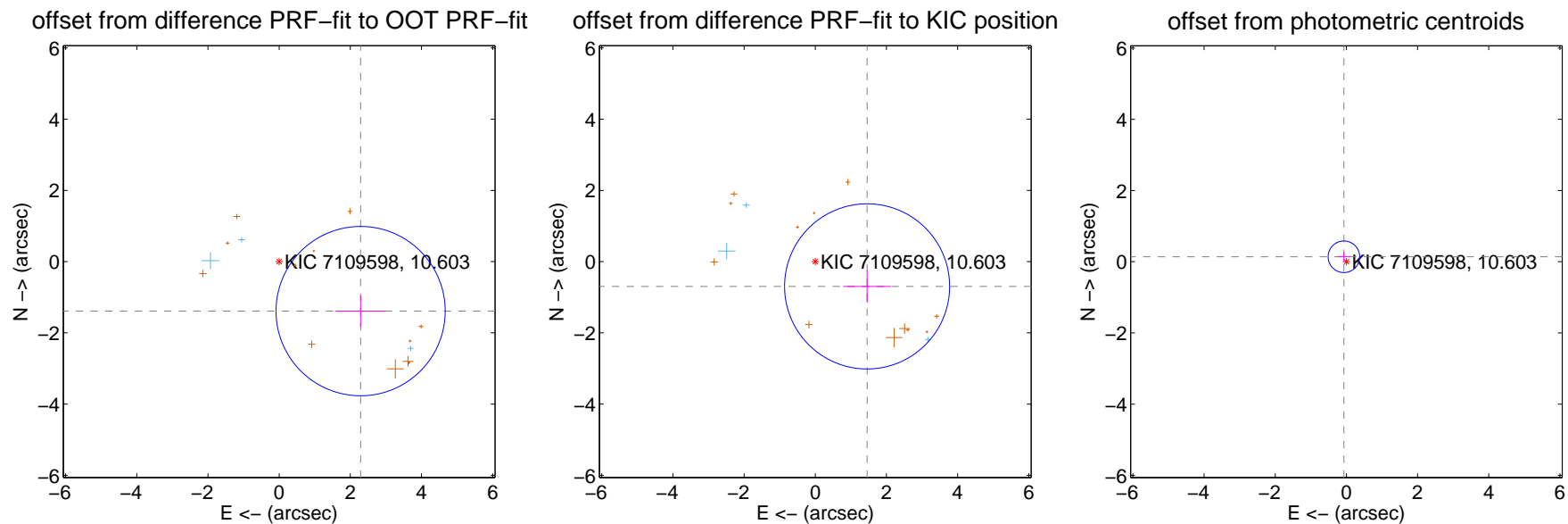
DV Centroid Data

Supplemental centroid analysis for 007109598-04. **Kepler magnitude: 10.60.** Transit SNR 15.30

There are 5 quarters with good PRF difference image offsets

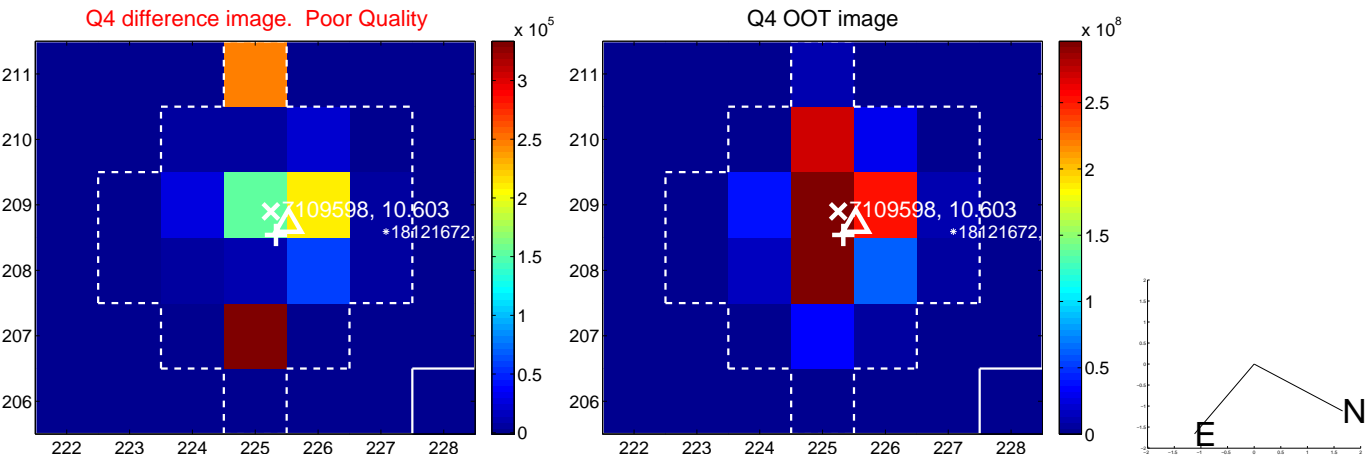
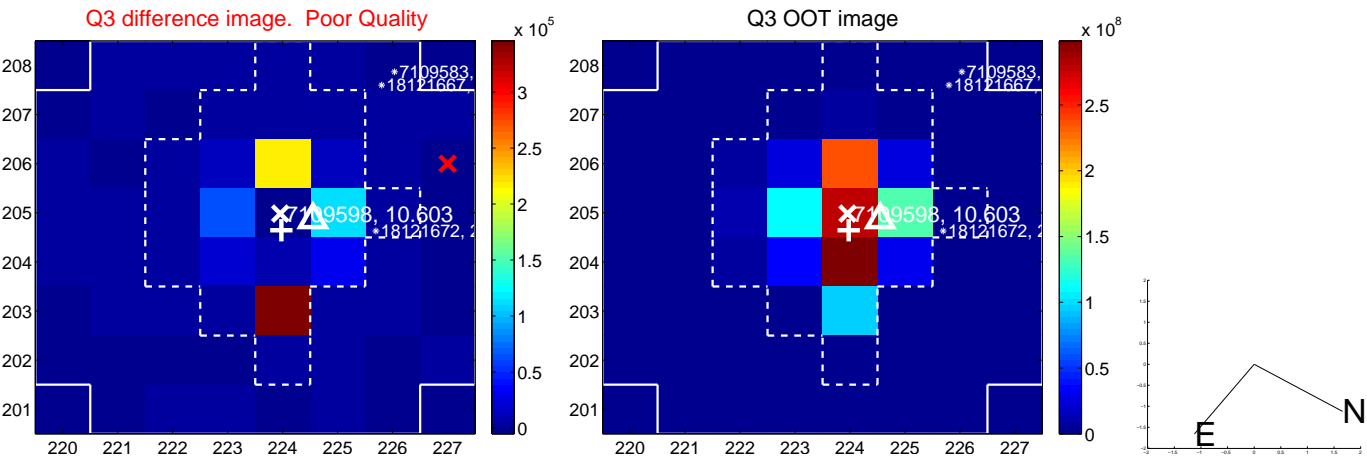
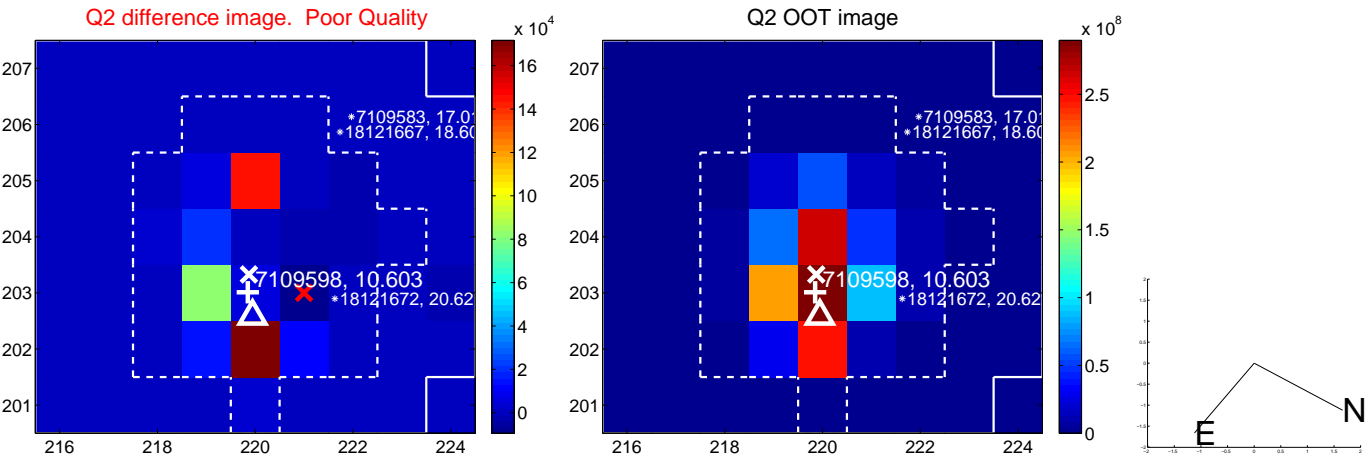
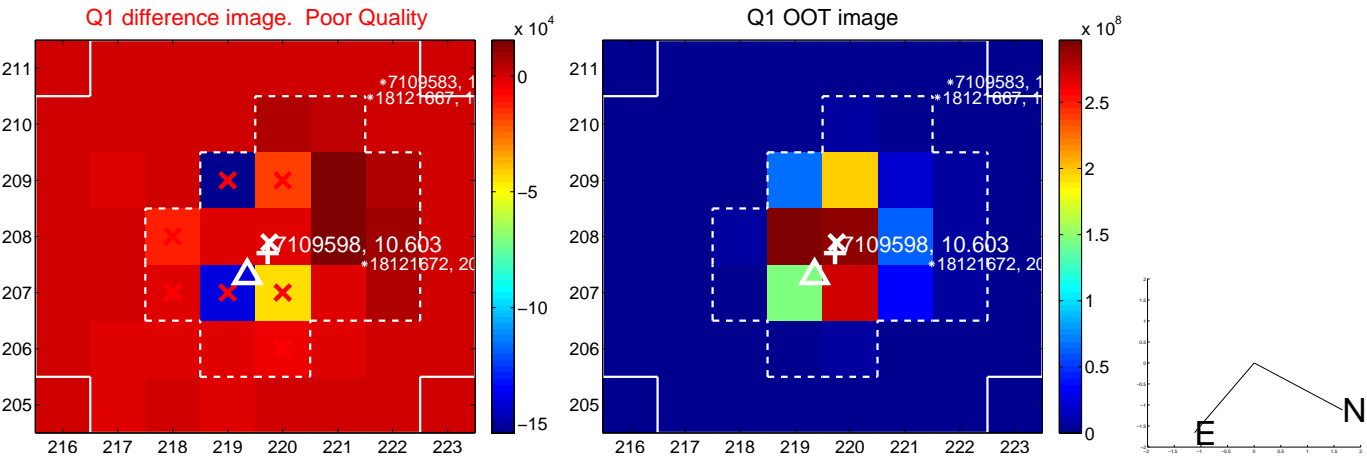
The direct PRF centroid is offset from the target star catalog position by about 0.58 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.677 ± 0.792	3.38	-2.288 ± 0.704	-1.389 ± 0.431
PRF-fit source offset from KIC position	1.613 ± 0.773	2.09	-1.456 ± 0.670	-0.695 ± 0.457
photometric centroid source offset	0.16 ± 0.15	1.05	0.07 ± 0.19	0.14 ± 0.14

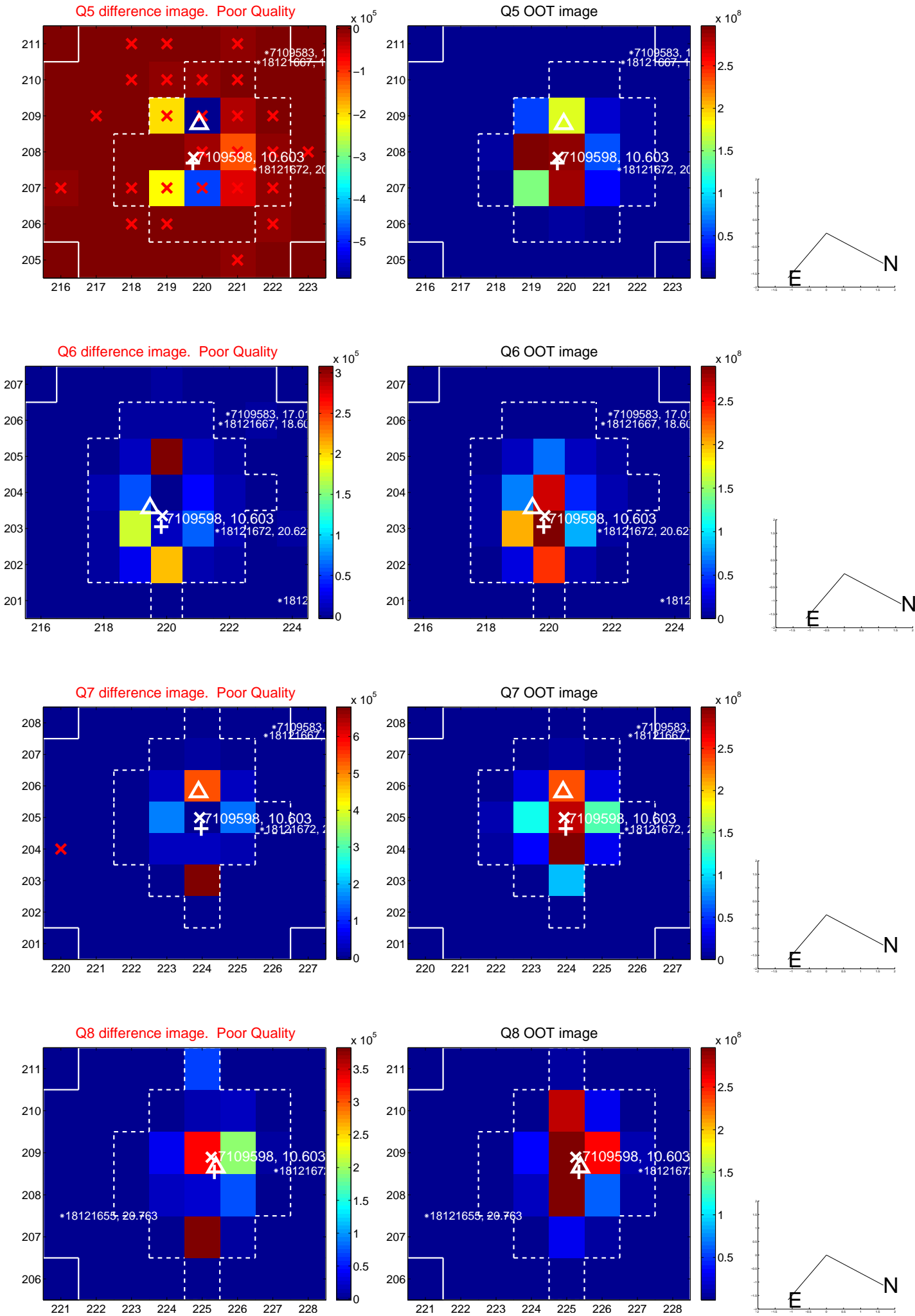


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

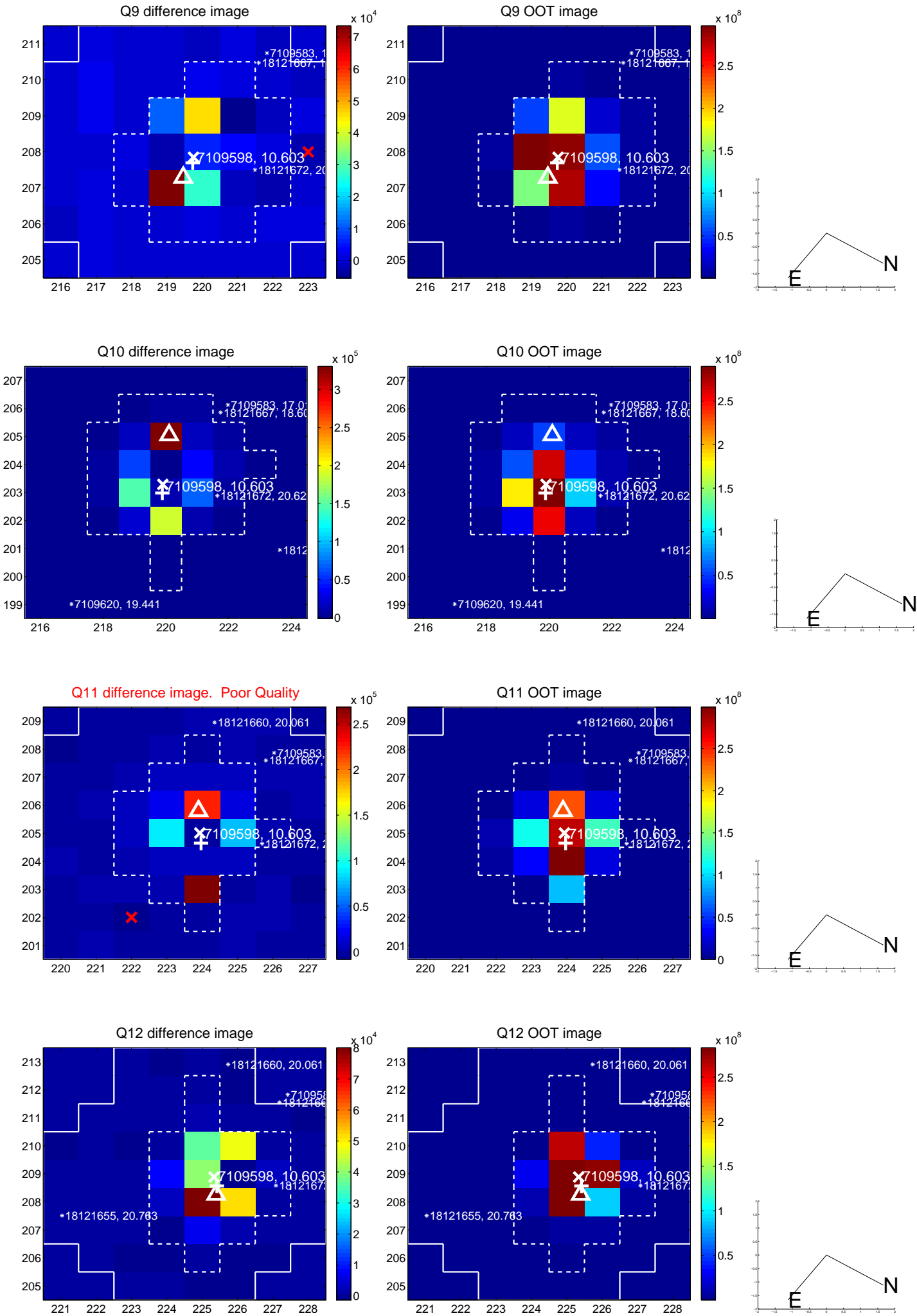
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



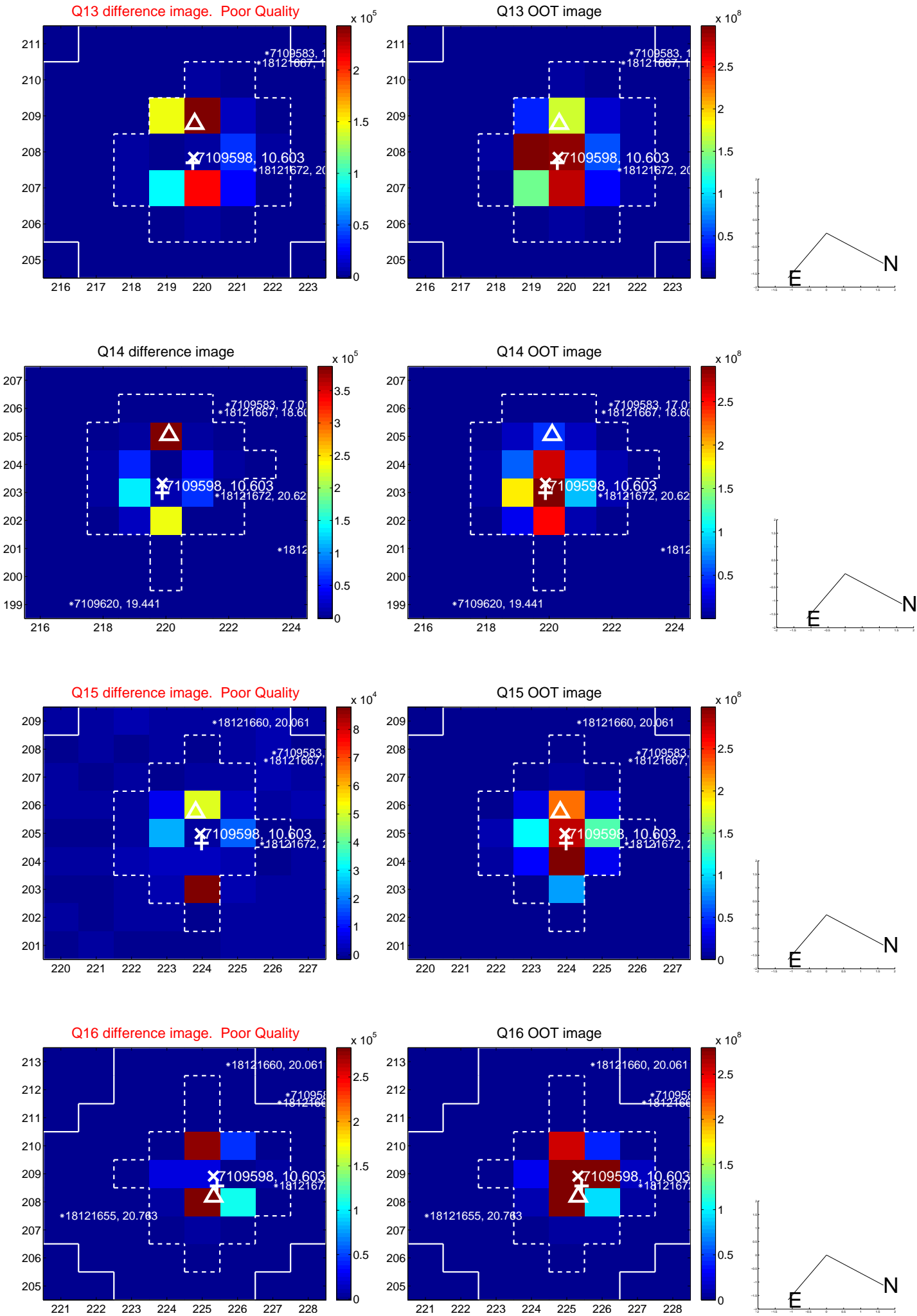
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



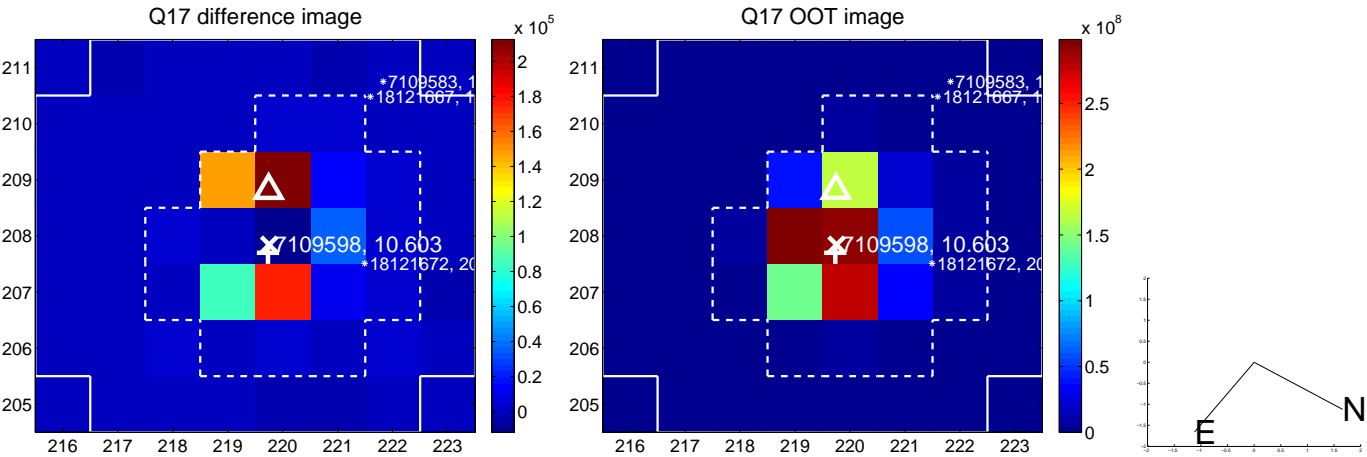
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



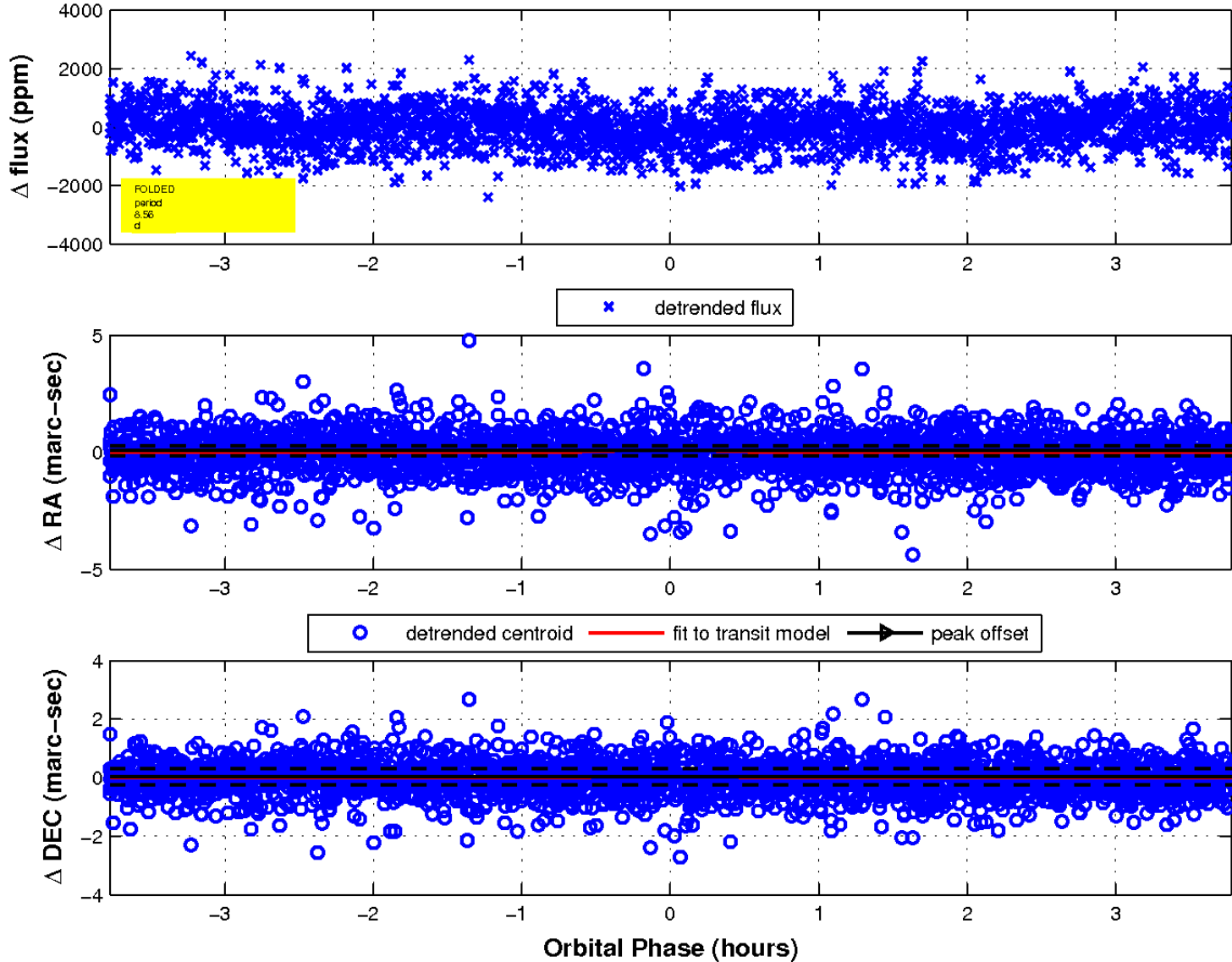
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

Declination

