

KIC 010862759

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})
010862759-01	OBS	8035.01	29.485669	151.865142	111.2	4.394	8.3	8.5	1.41	6870	1.70	93.49
010862759-02	OBS	No	4.637444	132.384216	21.9	17.312	7.7	5.9	1.41	6870	0.82	1101.23
010862759-03	OBS	No	206.911847	183.520322	201.3	7.412	10.7	6.1	1.41	6870	2.28	6.96
010862759-04	OBS	No	4.637125	134.770067	36.5	13.145	9.5	10.2	1.41	6870	0.96	1101.33
010862759-05	OBS	No	192.379959	208.232568	149.2	11.834	9.8	4.9	1.41	6870	1.75	7.67

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010862759-01	OBS	PC	0.85	0	0	0	0	NO_COMMENT
010862759-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
010862759-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010862759-04	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD
010862759-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST

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

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

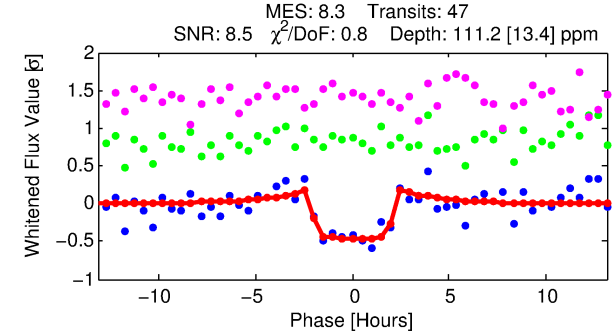
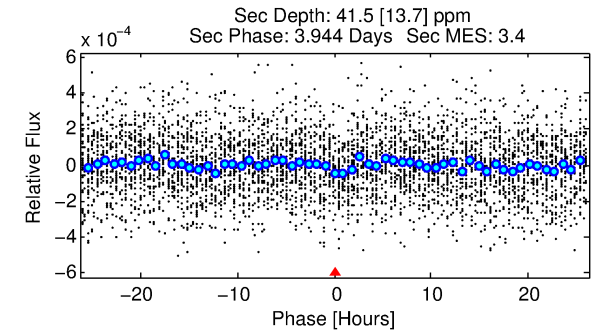
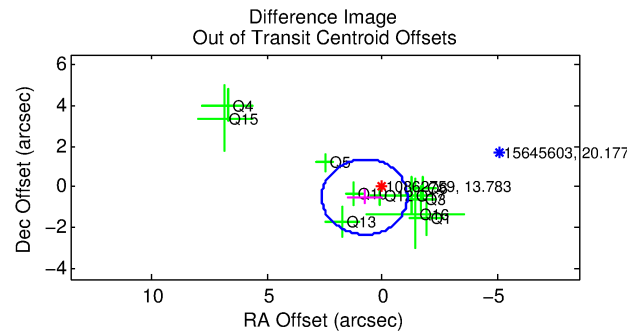
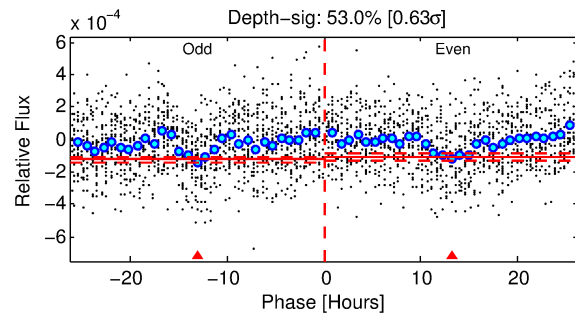
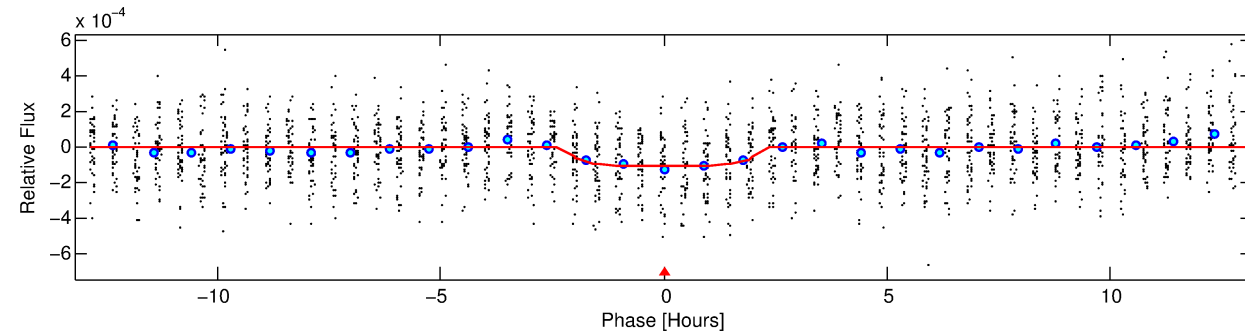
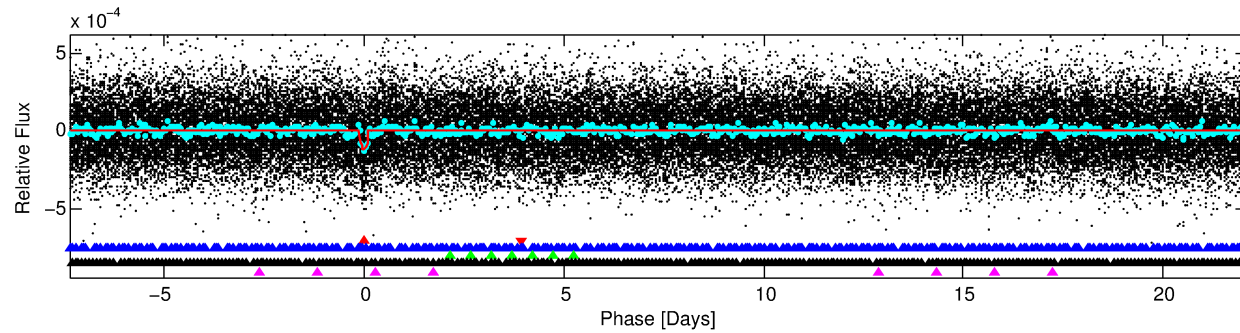
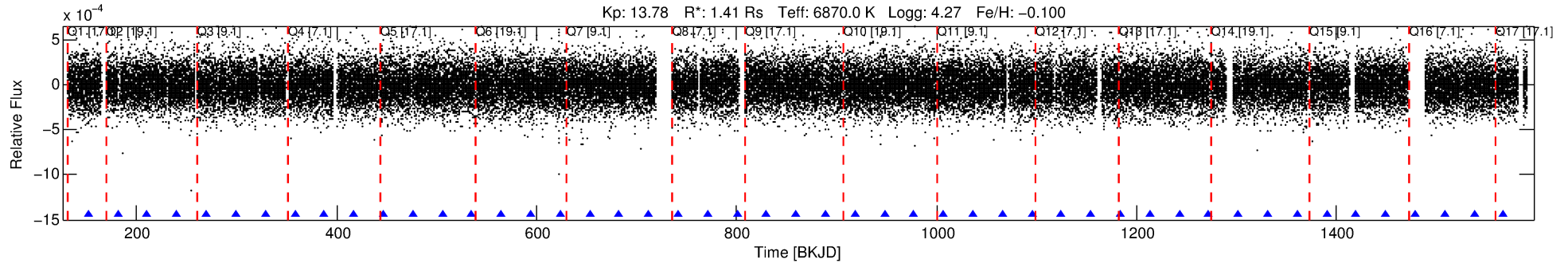
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010862759-01

No Significant Match Found

DV One-Page Summary

KIC: 10862759 Candidate: 1 of 5 Period: 29.486 d



DV Fit Results:

Period = 29.48567 [0.00028] d
Epoch = 151.8651 [0.0077] BKJD
Rp/R* = 0.0110 [0.0053]
a/R* = 26.12 [74.98]
b = 0.87 [0.79]
Seff = 93.49 [39.00]
Teq = 793 [83] K
Rp = 1.70 [1.00] Re
a = 0.2056 [0.0572] AU
Ag = 335.56 [365.13] [0.92 σ]
Teffp = 5247 [1349] K [3.30 σ]

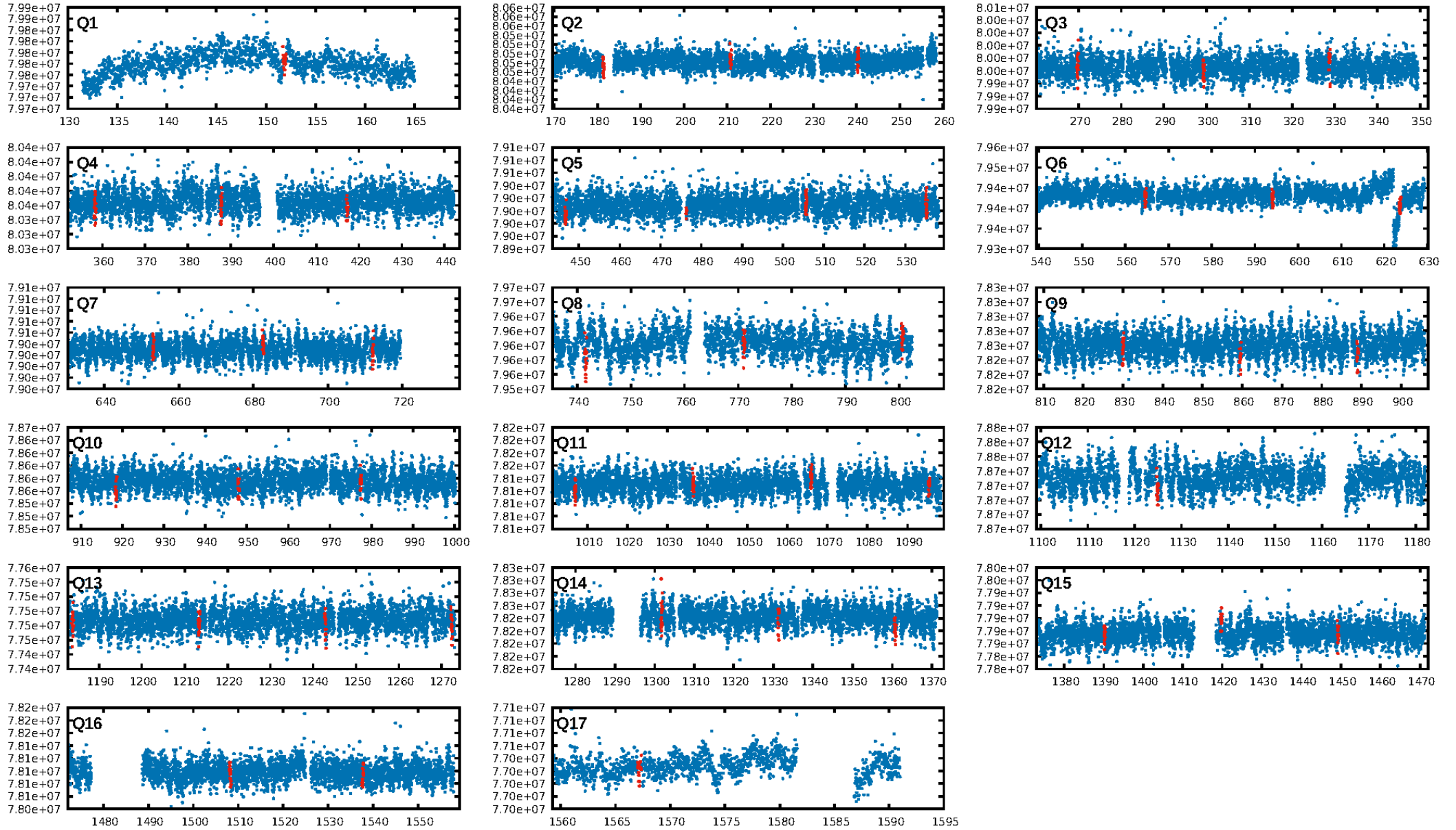
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [33.39 σ]
LongPeriod-sig: 100.0% [309.70 σ]
ModelChiSquare2-sig: 54.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.21e-09
RollingBand-fgt: 1.00 [45/45]
GhostDiagnostic-chr: 2.138
Centroid-sig: 3.8%
Centroid-so: 1.484 arcsec [1.51 σ]
OotOffset-rm: 0.914 arcsec [1.48 σ]
KicOffset-rm: 0.869 arcsec [1.39 σ]
OotOffset-st: 2/2/3/4 [11]
KicOffset-st: 2/2/3/4 [11]
DiffImageQuality-fgm: 0.45 [5/11]
DiffImageOverlap-fno: 0.82 [14/17]

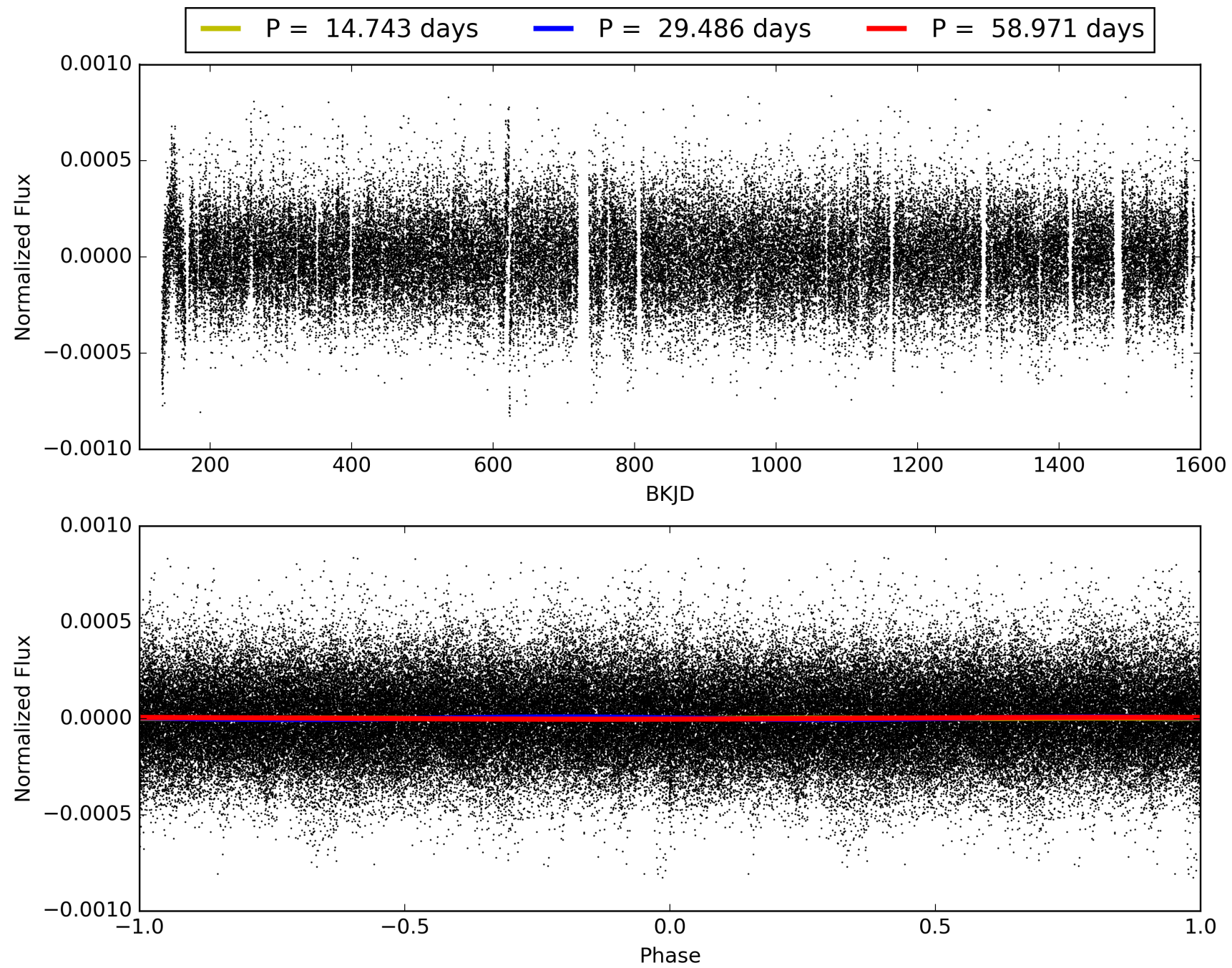
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 09:25:43 Z

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

TCE 010862759-01, PDC Light Curves

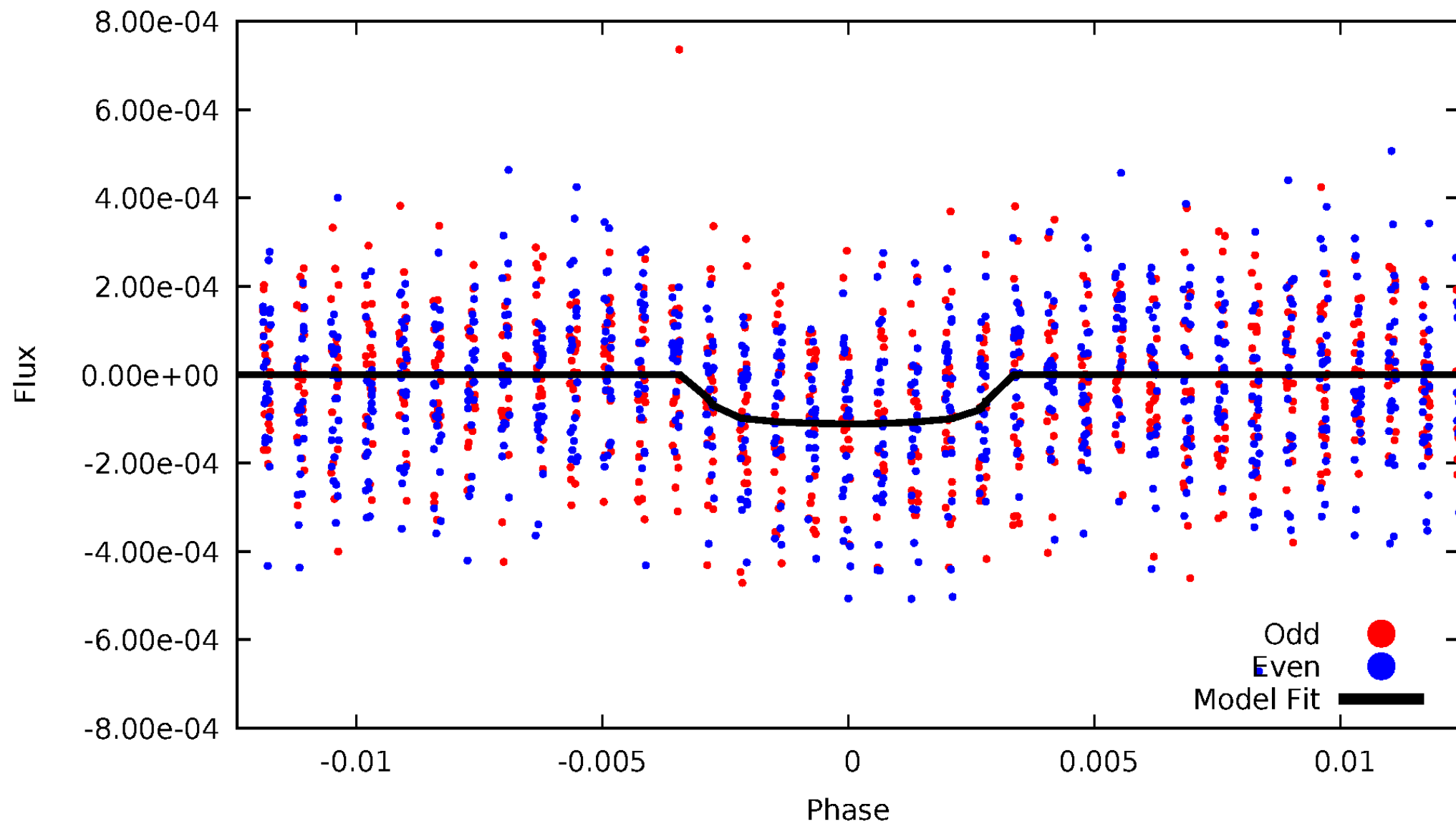


TCE 010862759-01



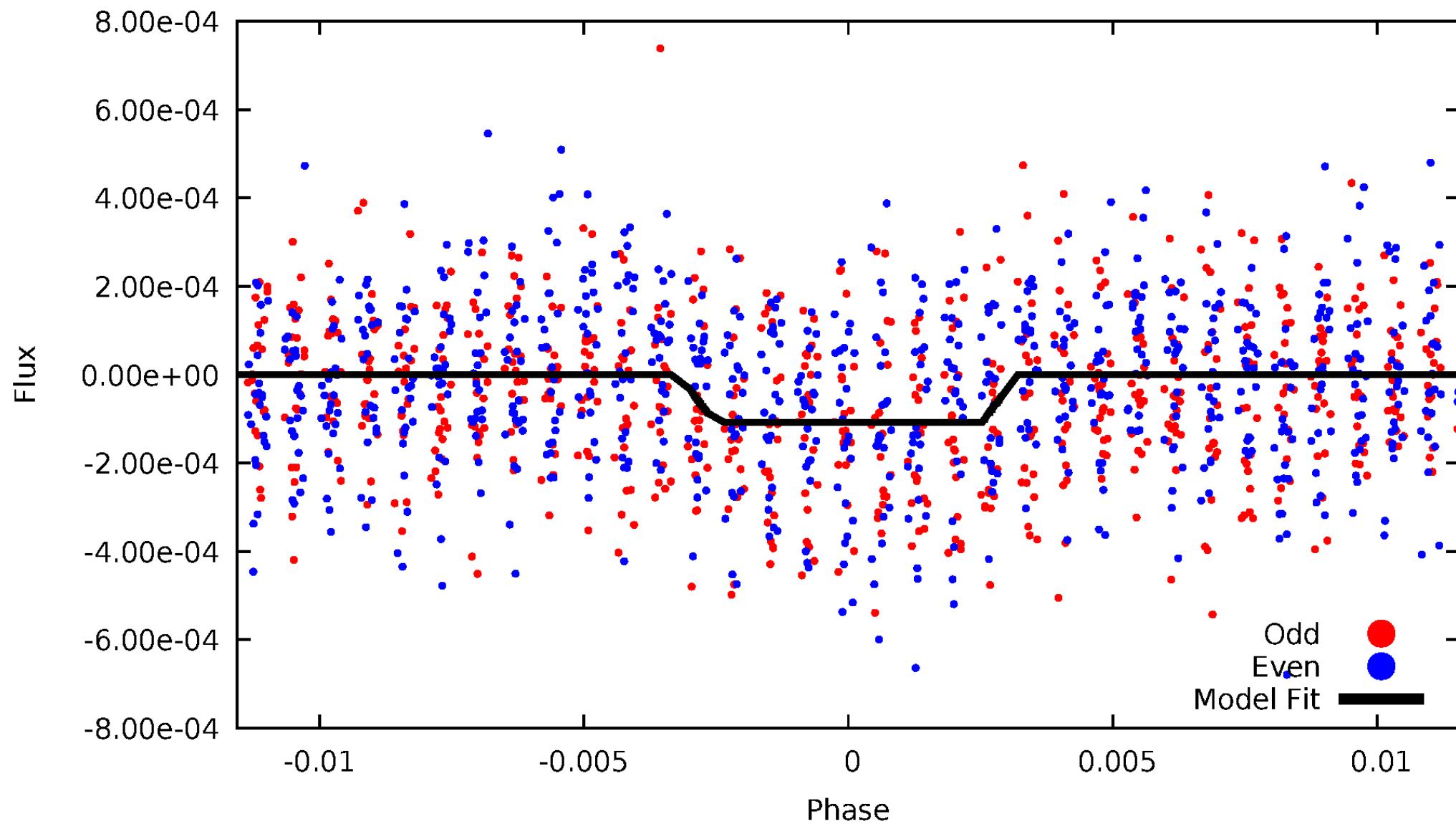
DV Odd/Even

TCE 010862759-01

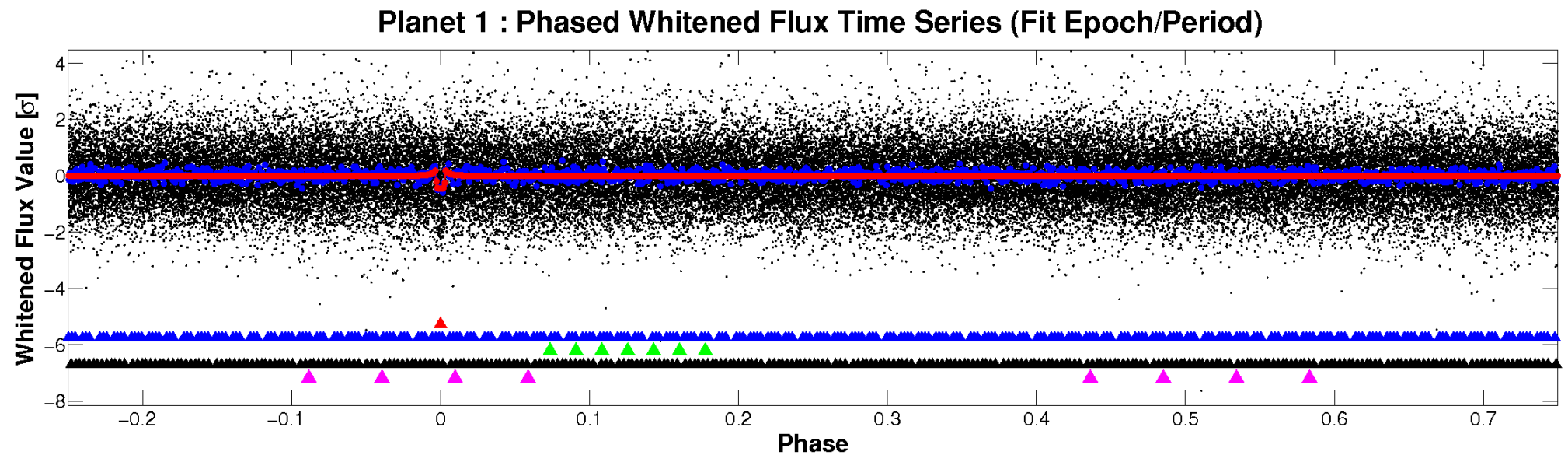
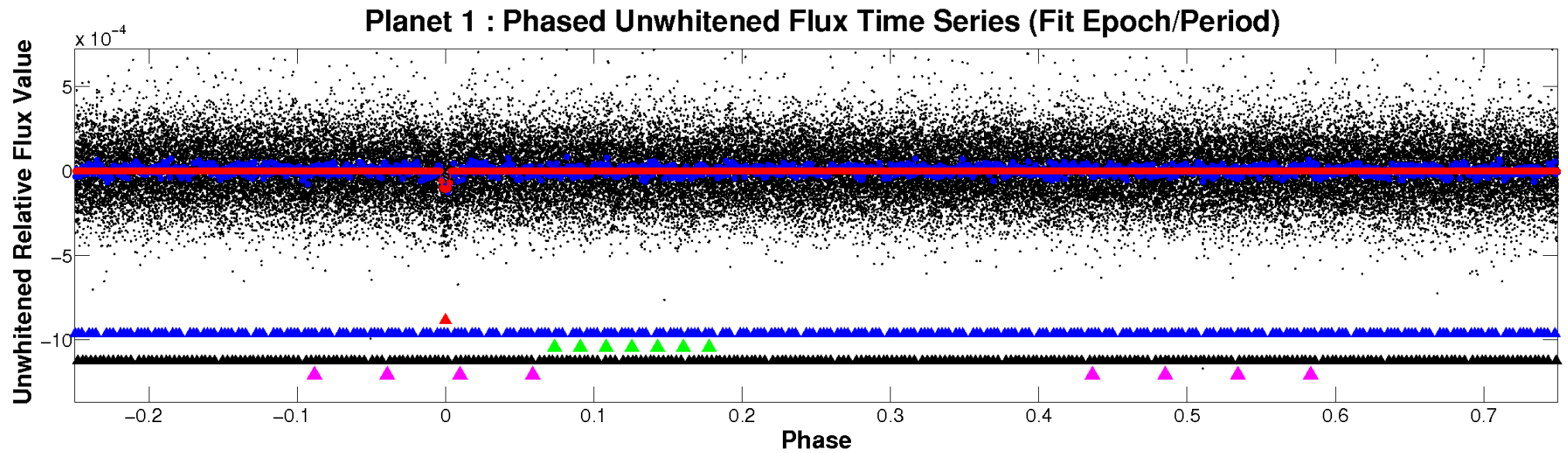


ALT Odd/Even

TCE 010862759-01

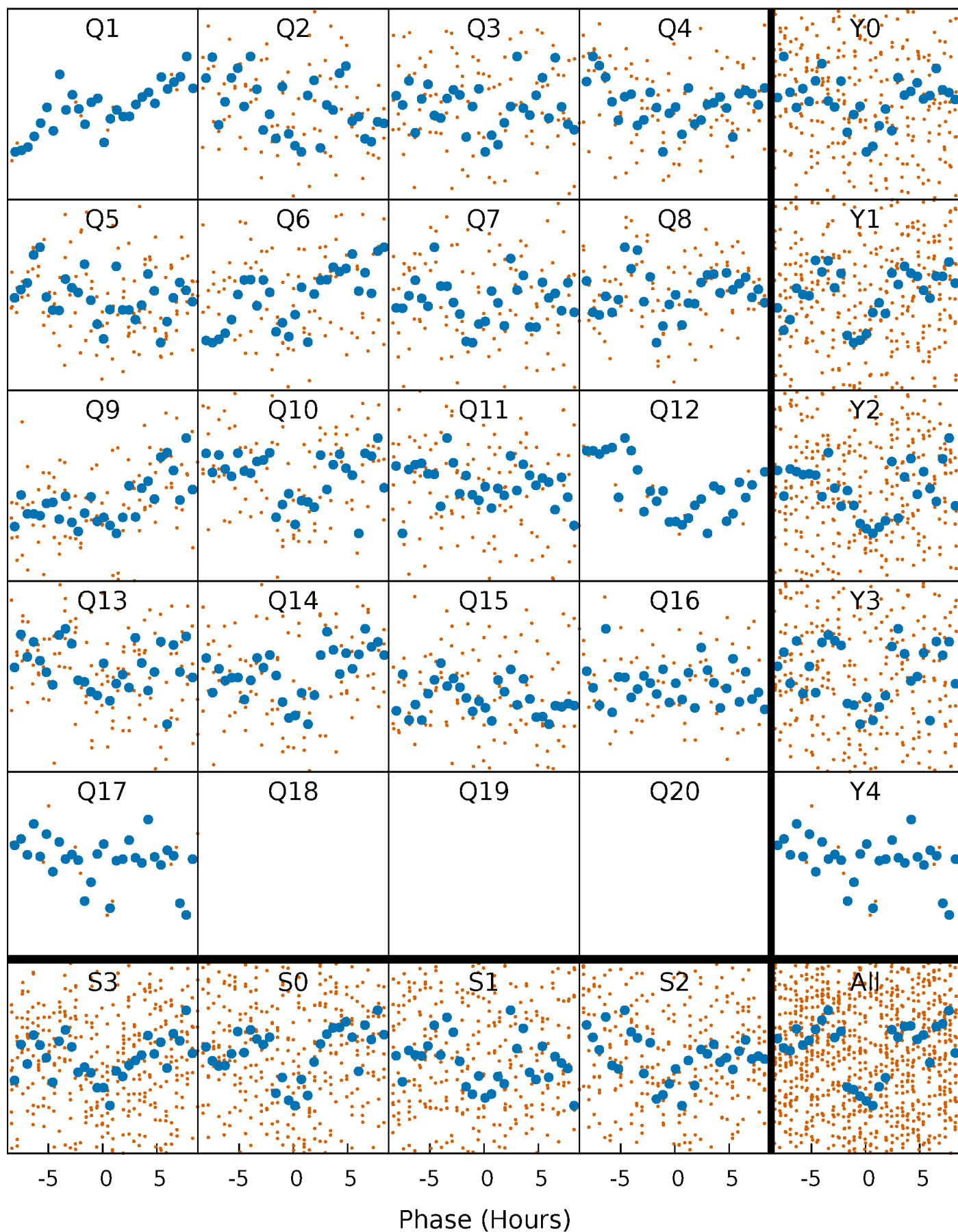


Non-Whitened Vs. Whitened Light Curve



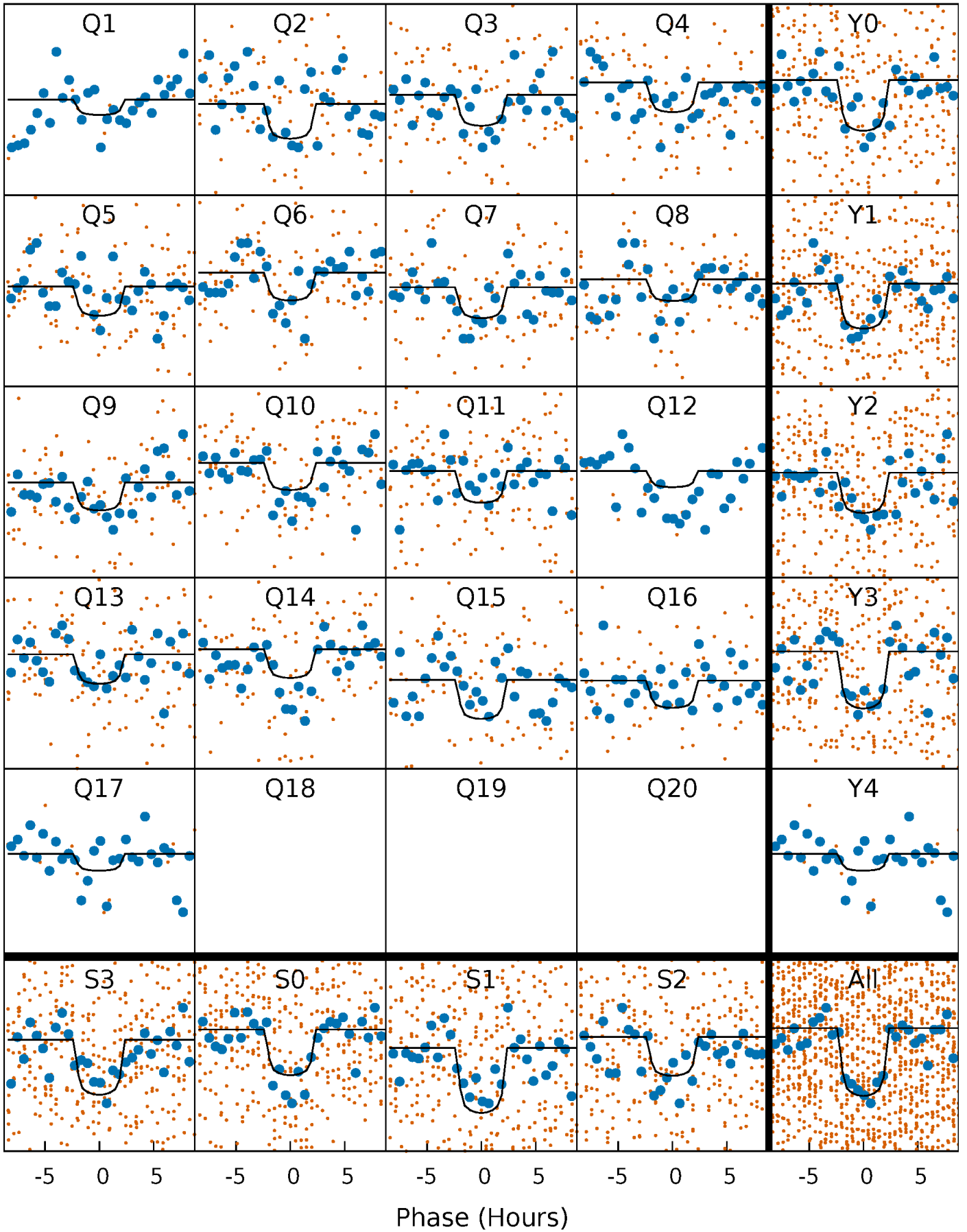
PDC Quarter-Phased Transit Curves

TCE 010862759-01 P= 29.485669 Days $T_0=151.865142$ (BKJD)



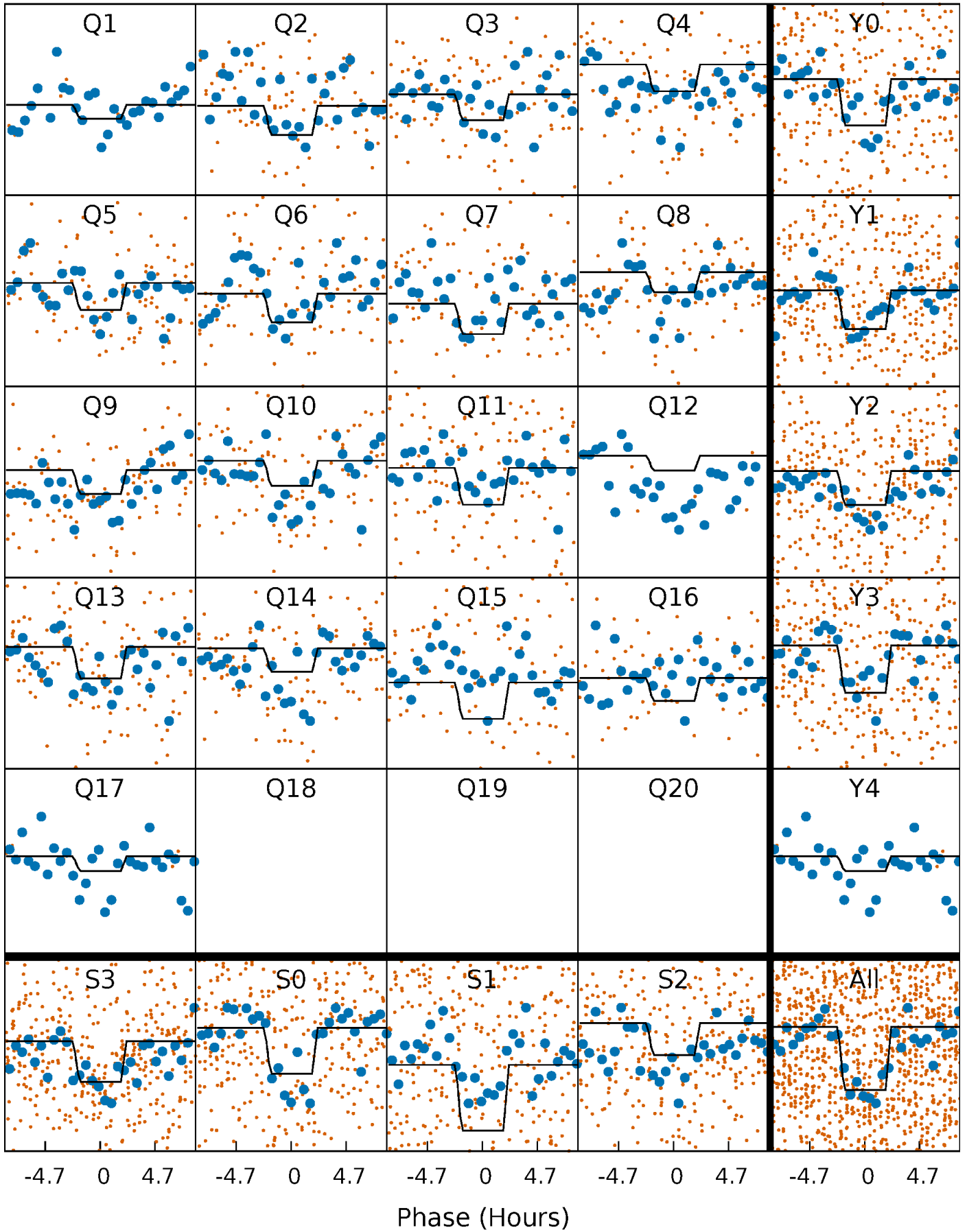
DV Quarter-Phased Transit Curves

TCE 010862759-01 P= 29.485669 Days $T_0=151.865142$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

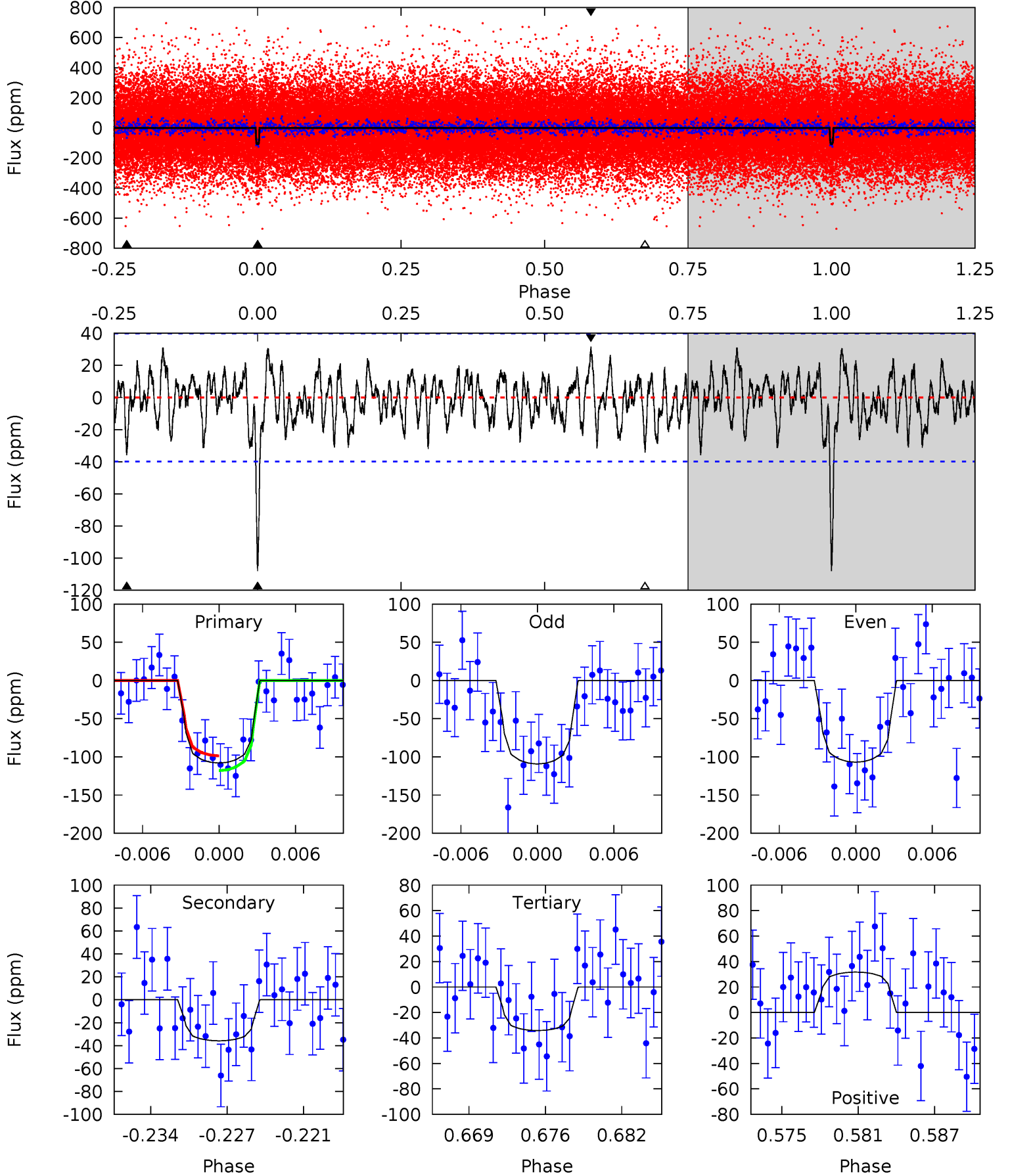
TCE 010862759-01 P= 29.485838 Days $T_0=151.862014$ (BKJD)



DV Model-Shift Uniqueness Test

010862759-01, $P = 29.485669$ Days, $E = 122.379473$ Days

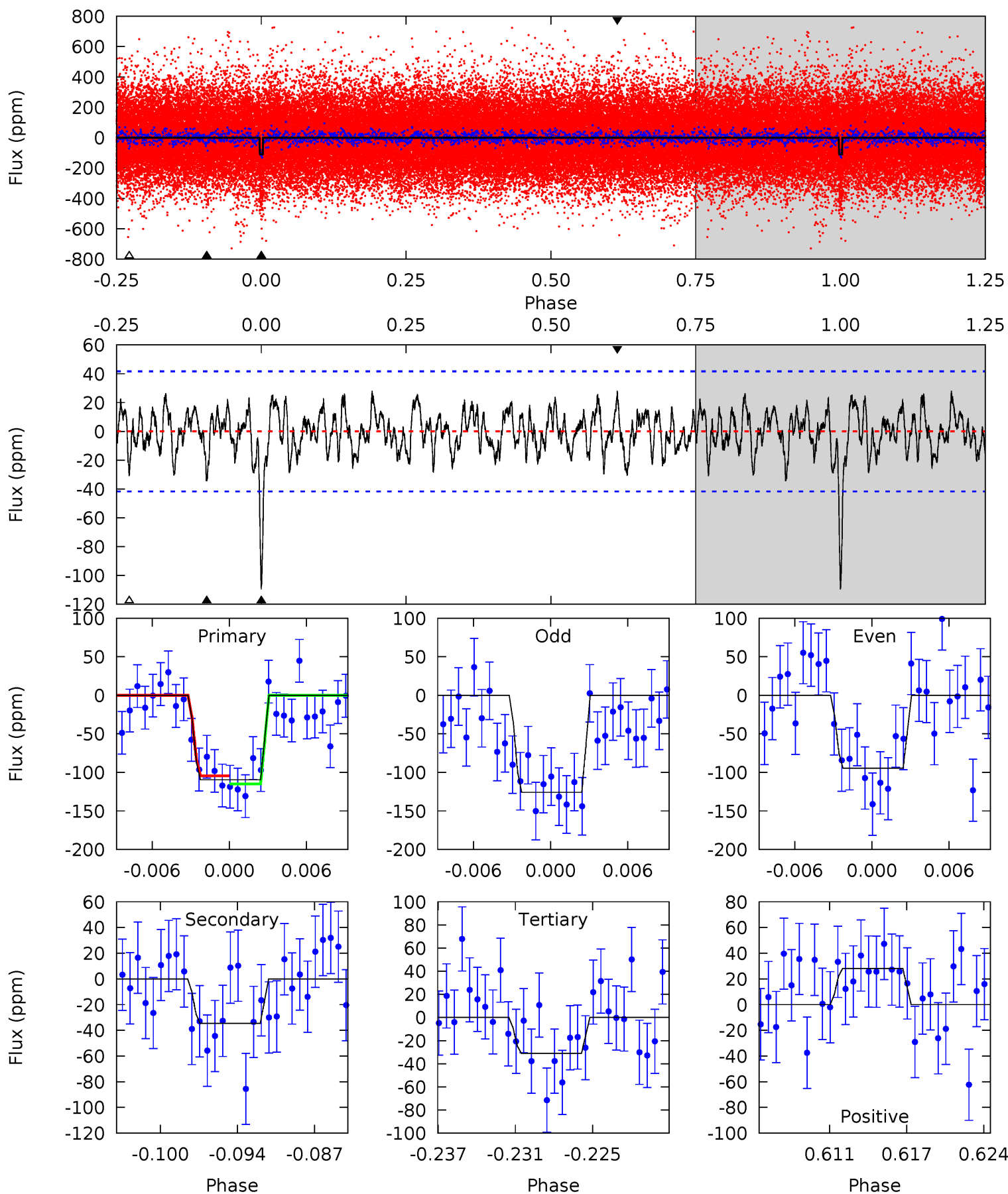
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.9	4.60	4.39	4.07	5.11	2.73	1.54	9.47	9.79	0.21	0.53	0.15	1.00	0.23	1.24



Alt Model-Shift Uniqueness Test

010862759-01, P = 29.485838 Days, E = 122.376176 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.4	4.24	3.81	3.46	5.12	2.74	1.47	9.63	9.98	0.43	0.78	1.92	0.94	0.20	0.65



Stellar Parameters For KIC 010862759

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6870^{+168}_{-264}	$4.266^{+0.087}_{-0.203}$	$-0.100^{+0.250}_{-0.350}$	$1.407^{+0.487}_{-0.209}$	$1.337^{+0.201}_{-0.201}$	$0.677^{+0.279}_{-0.378}$
	+2%/-4%	+2%/-5%	+250%/-350%	+35%/-15%	+15%/-15%	+41%/-56%
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 010862759-01 / KOI 8035.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-36 ± 8	$1.77^{+0.90}_{-0.84}$	1124^{+86}_{-64}	5062^{+1653}_{-765}	260^{+632}_{-150}
Alt.	-35 ± 8	$1.61^{+0.92}_{-0.75}$	1123^{+81}_{-64}	5211^{+1971}_{-846}	308^{+780}_{-189}

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 $A_{obs} \gg 1.0$

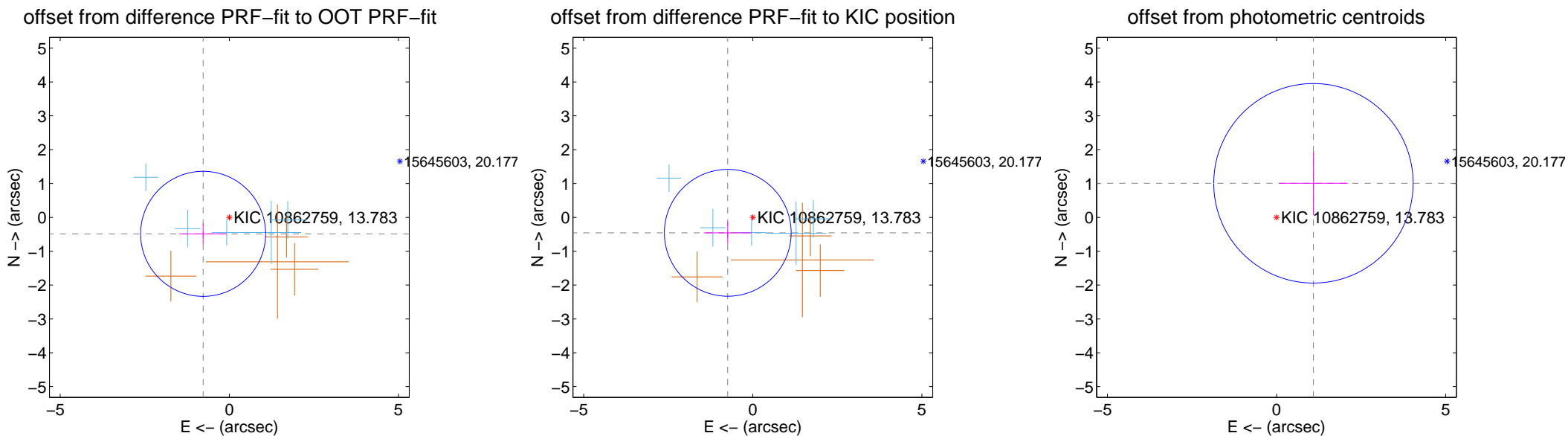
DV Centroid Data

Supplemental centroid analysis for 010862759-01. Kepler magnitude: 13.78. Transit SNR 8.47

There are 5 quarters with good PRF difference image offsets

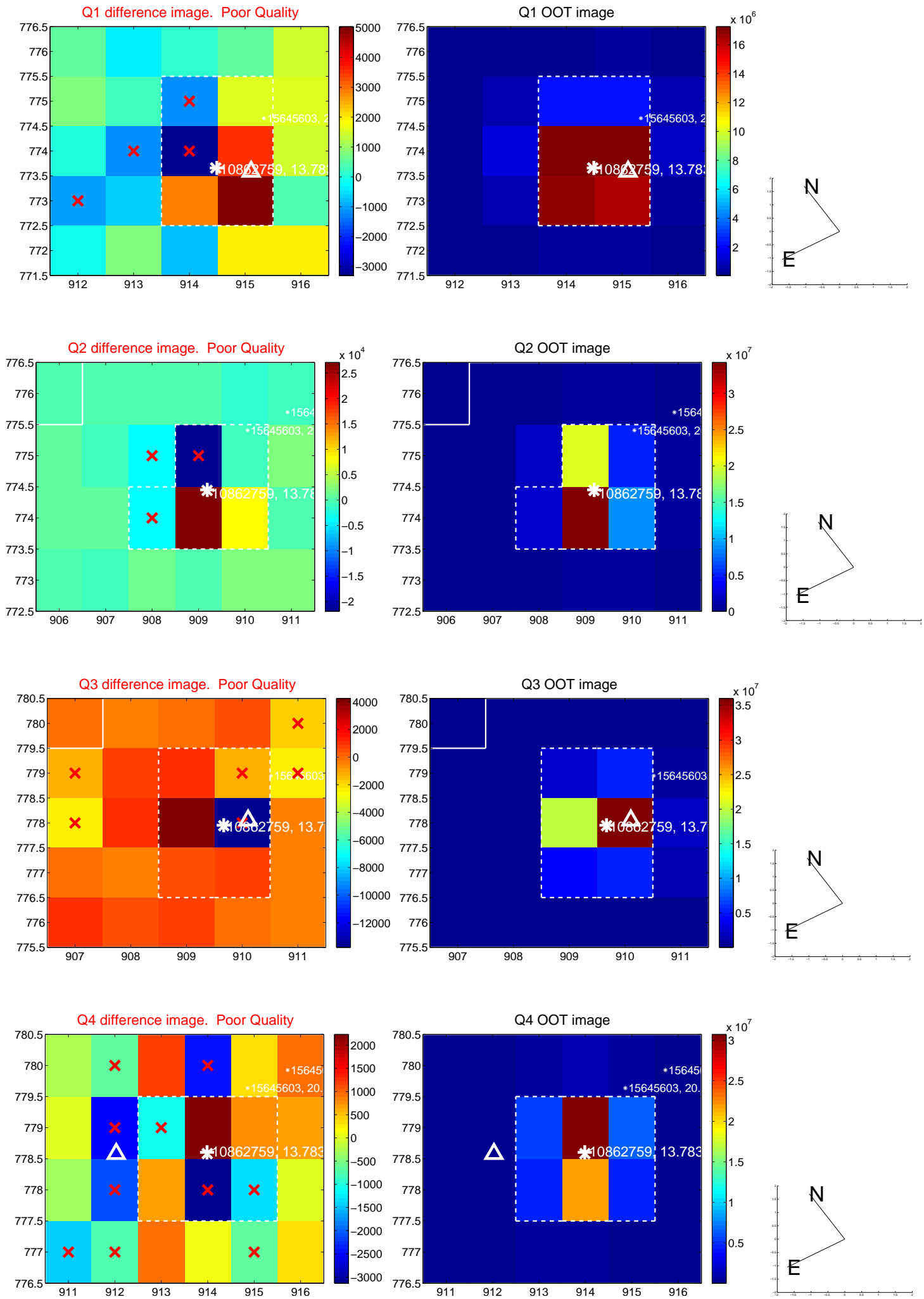
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.914 ± 0.616	1.48	0.774 ± 0.701	-0.486 ± 0.308
PRF-fit source offset from KIC position	0.869 ± 0.624	1.39	0.740 ± 0.706	-0.456 ± 0.320
photometric centroid source offset	1.48 ± 0.98	1.51	-1.09 ± 1.02	1.01 ± 0.94

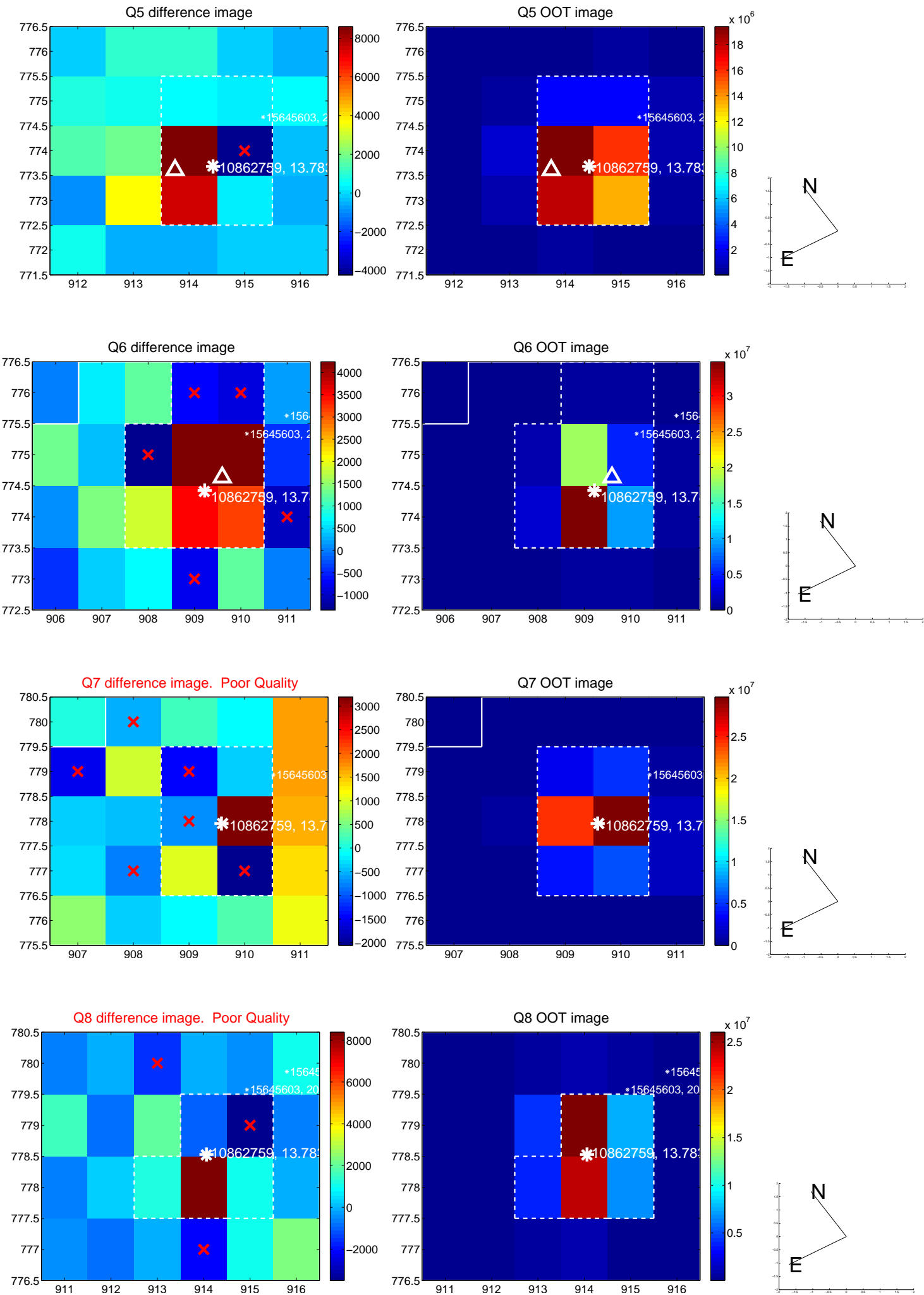


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

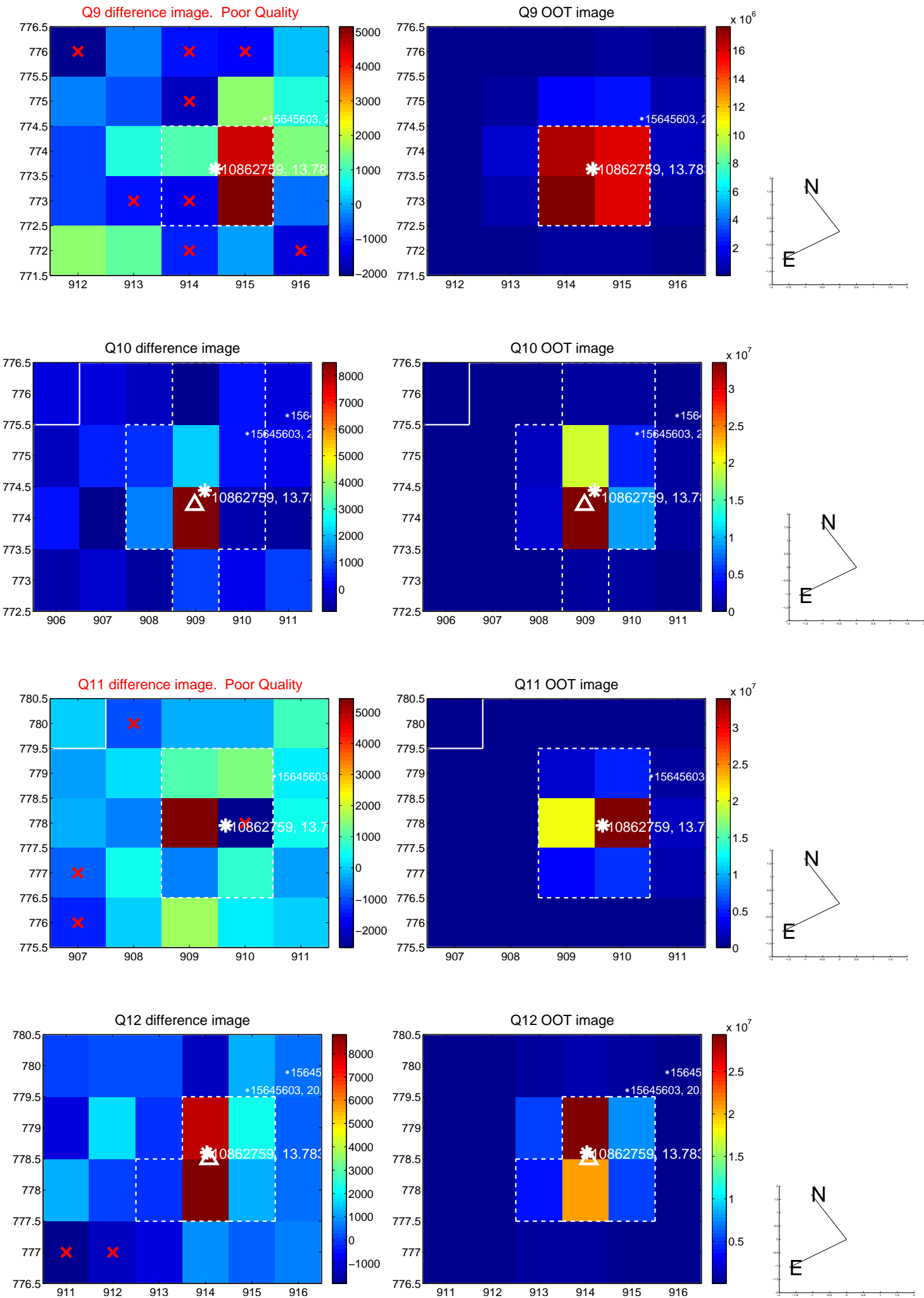
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



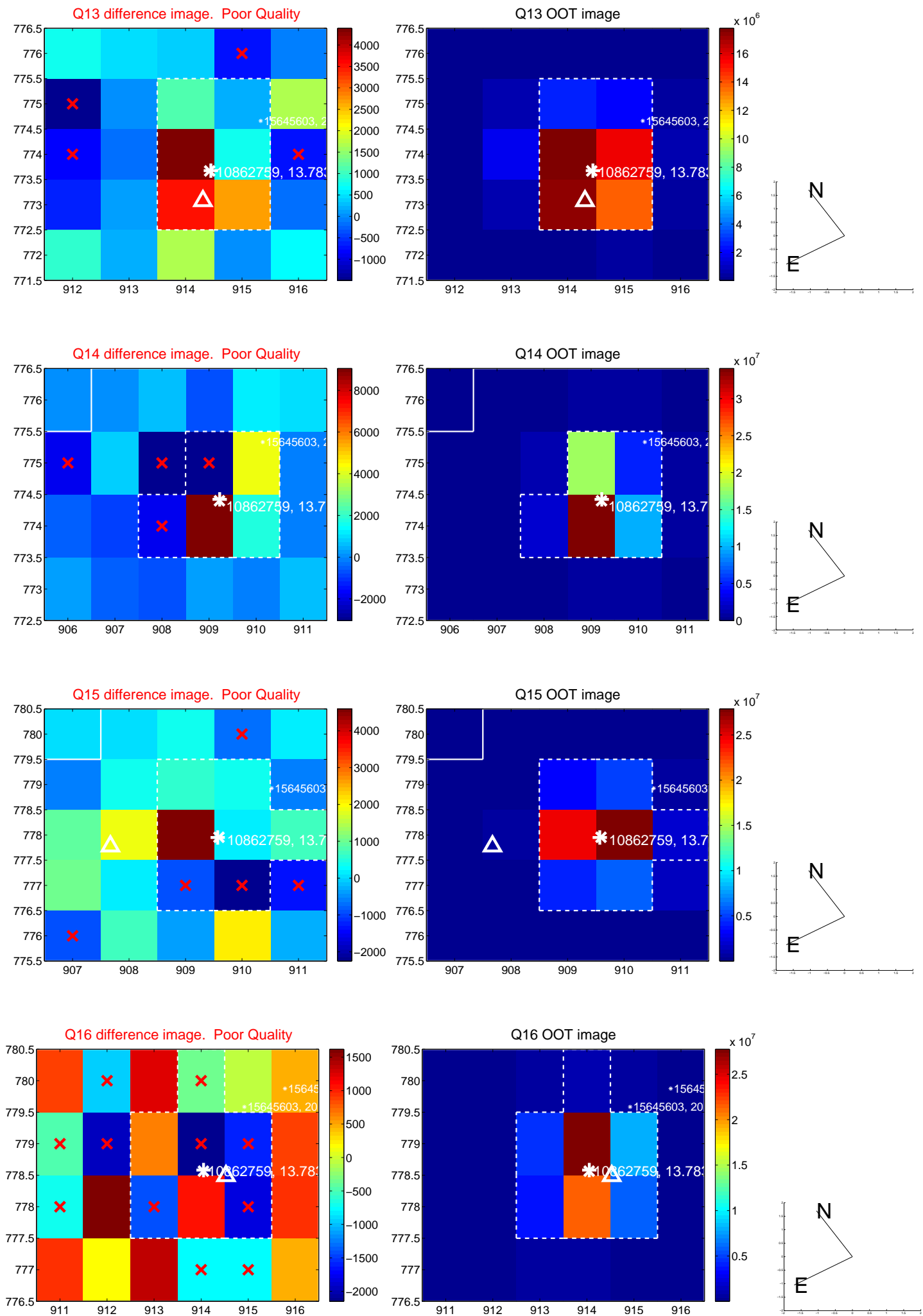
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



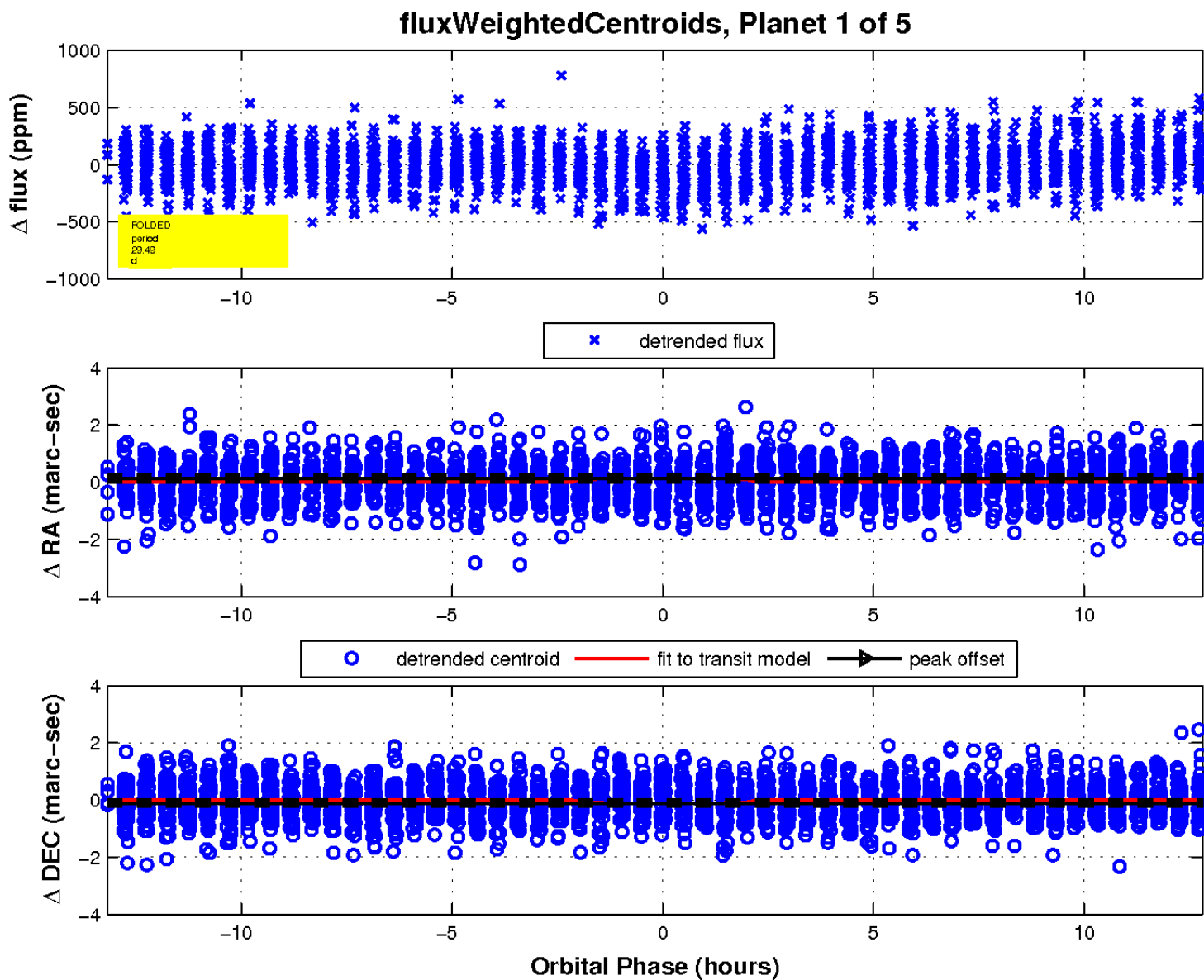
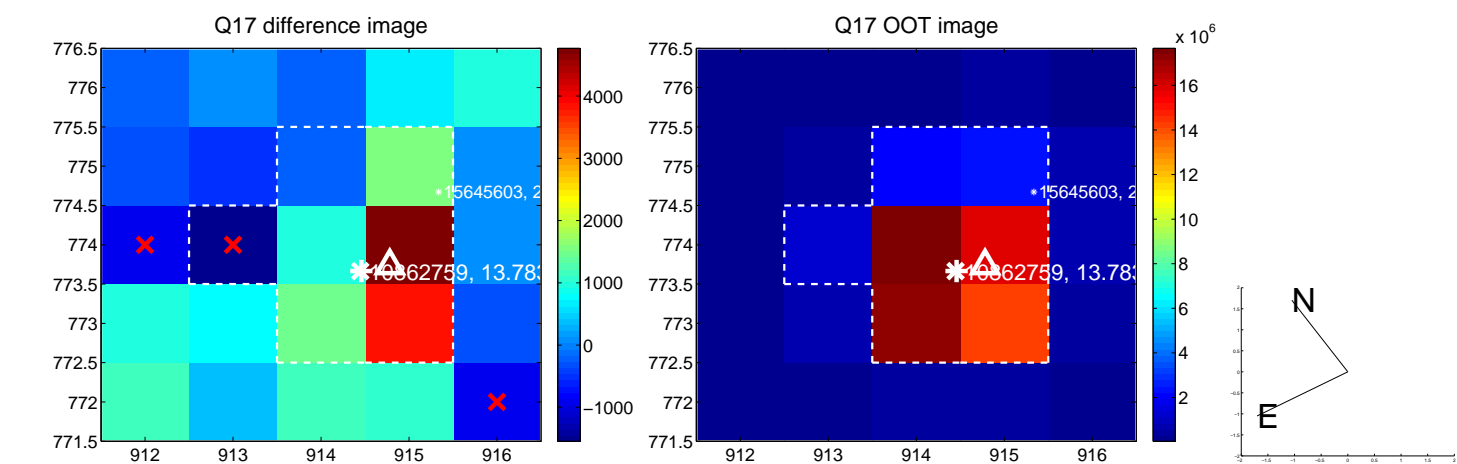
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

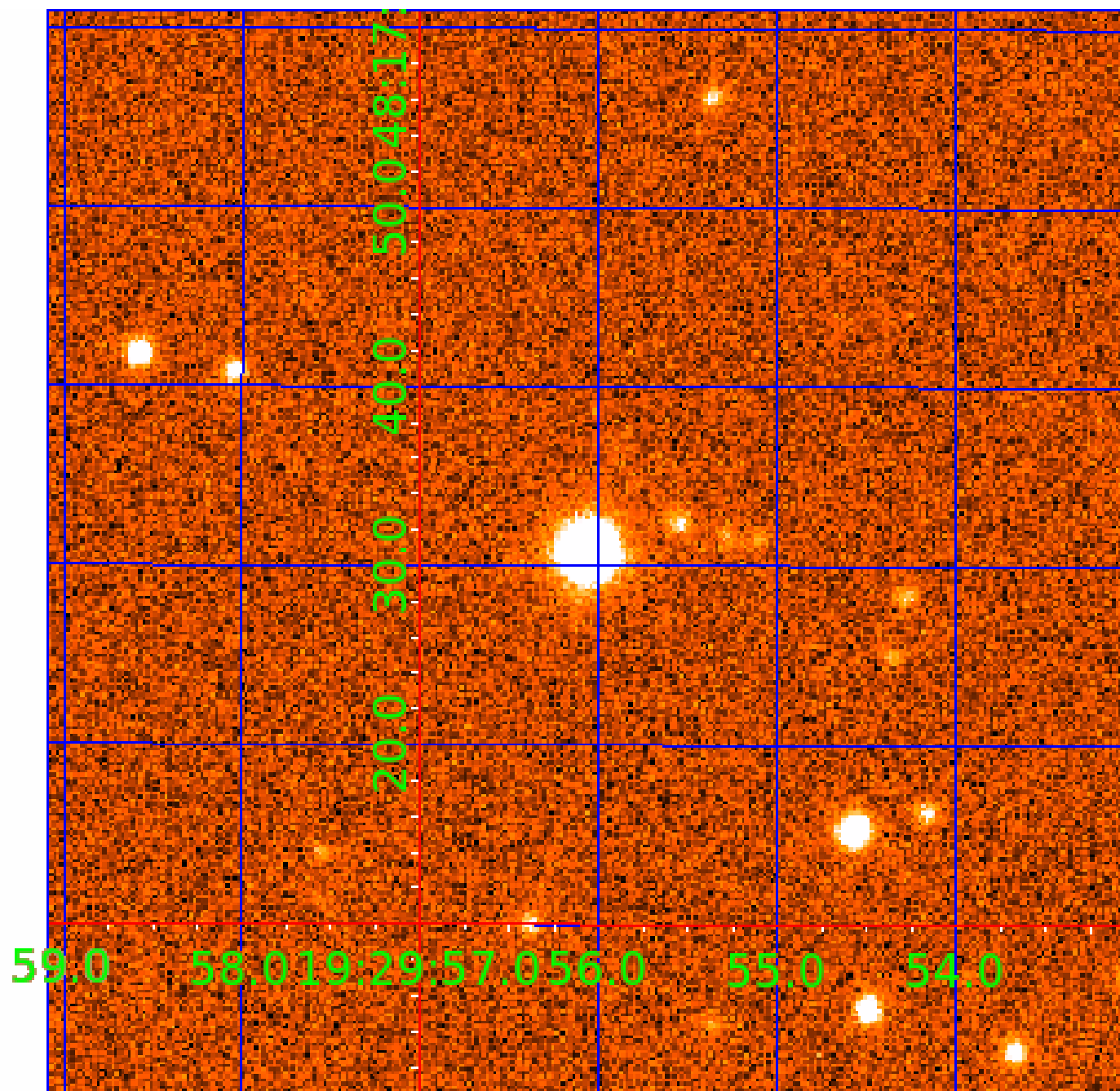


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010862759

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})
010862759-01	OBS	8035.01	29.485669	151.865142	111.2	4.394	8.3	8.5	1.41	6870	1.70	93.49
010862759-02	OBS	No	4.637444	132.384216	21.9	17.312	7.7	5.9	1.41	6870	0.82	1101.23
010862759-03	OBS	No	206.911847	183.520322	201.3	7.412	10.7	6.1	1.41	6870	2.28	6.96
010862759-04	OBS	No	4.637125	134.770067	36.5	13.145	9.5	10.2	1.41	6870	0.96	1101.33
010862759-05	OBS	No	192.379959	208.232568	149.2	11.834	9.8	4.9	1.41	6870	1.75	7.67

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010862759-01	OBS	PC	0.85	0	0	0	0	NO_COMMENT
010862759-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
010862759-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010862759-04	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD
010862759-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST

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

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

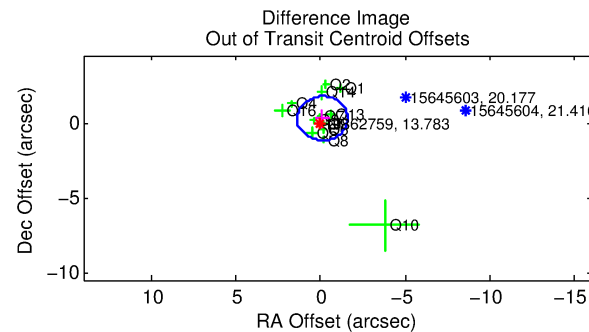
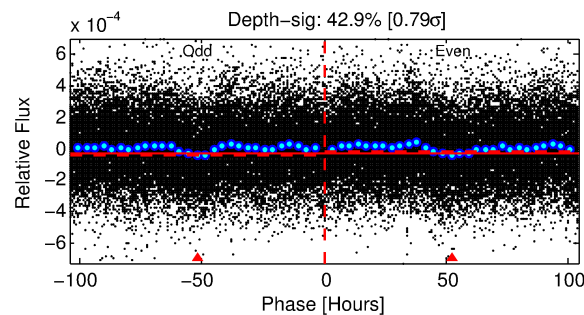
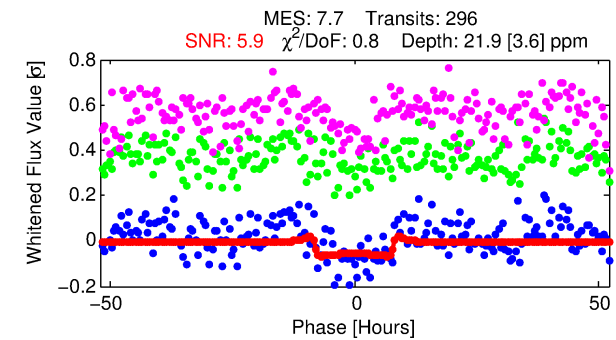
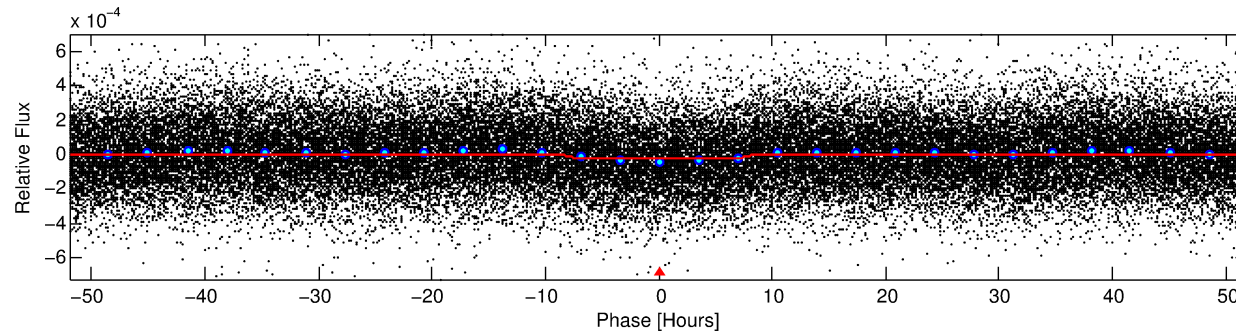
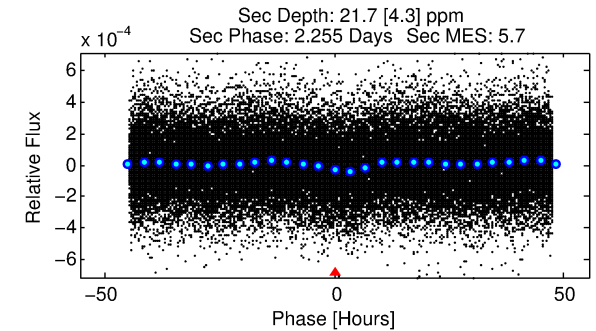
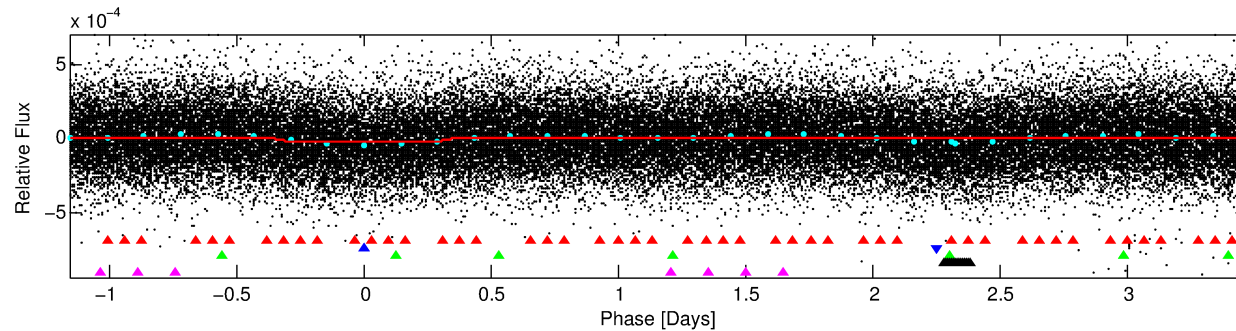
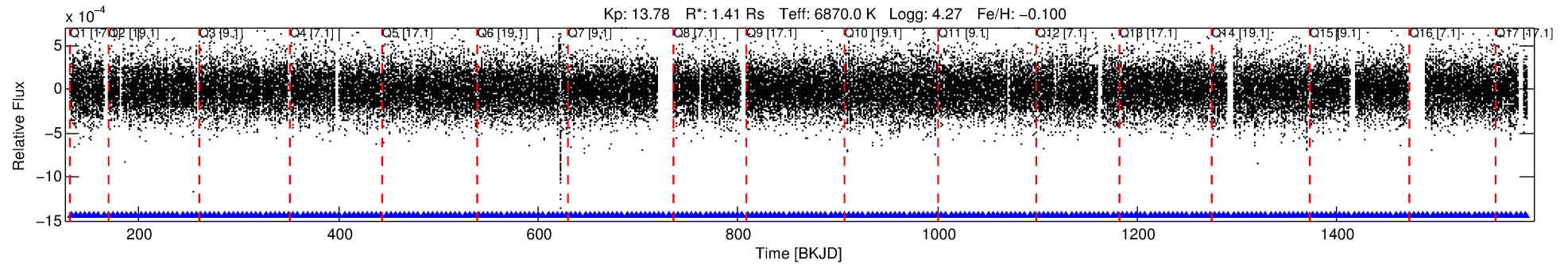
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010862759-02

No Significant Match Found

DV One-Page Summary

KIC: 10862759 Candidate: 2 of 5 Period: 4.637 d



DV Fit Results:

Period = 4.63744 [0.00016] d
Epoch = 132.3842 [0.0247] BKJD
Rp/R* = 0.0053 [0.0007]
a/R* = 1.15 [0.16]
b = 0.96 [0.05]
Seff = 1101.23 [459.33]
Teff = 1469 [153] K
Rp = 0.82 [0.30] Re
a = 0.0599 [0.0167] AU
Ag = 63.68 [31.89] [1.97σ]
Teffp = 6416 [565] K [8.45σ]

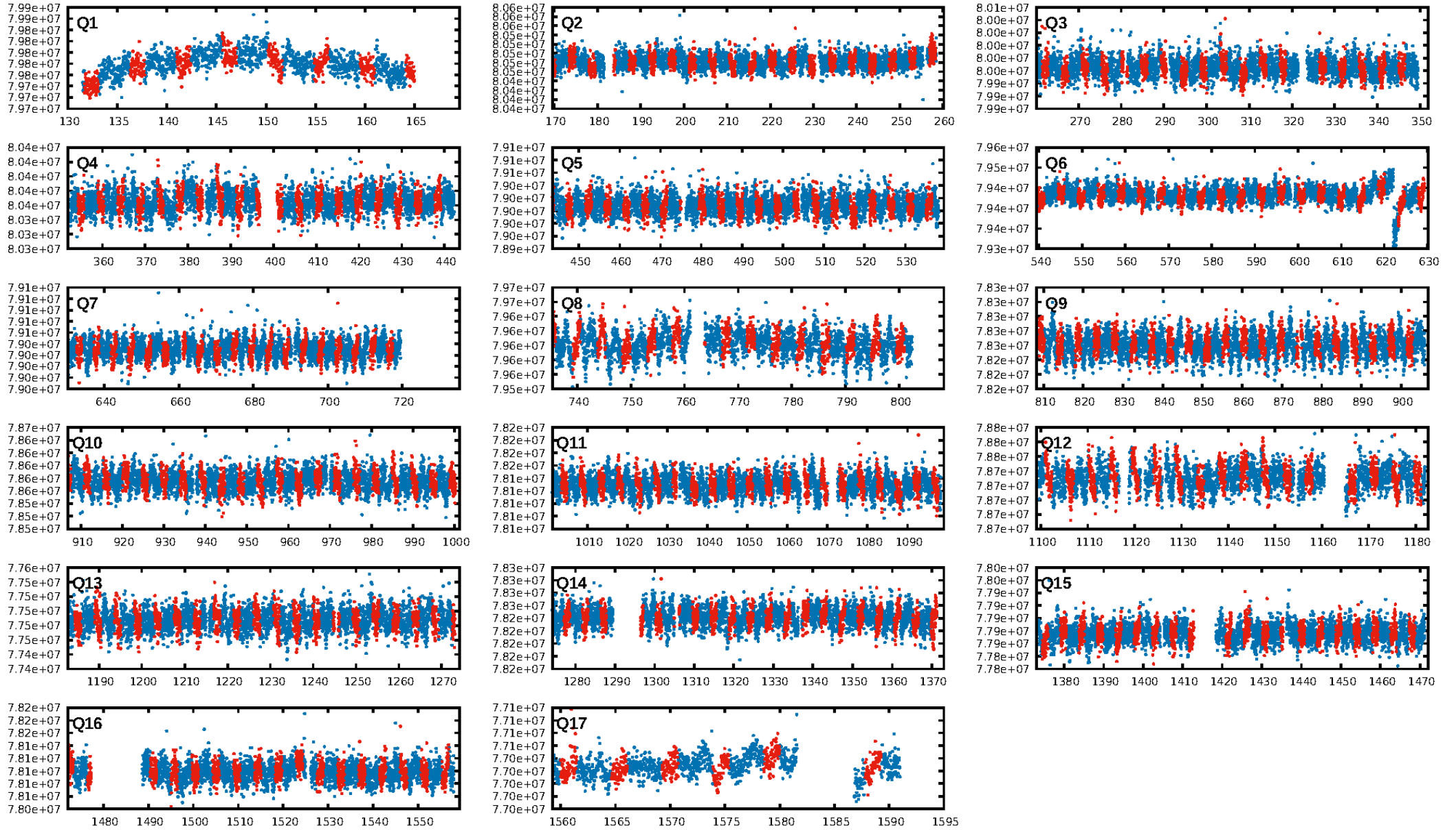
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: 100.0% [33.39σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.43e-15
RollingBand-fgt: 1.00 [282/282]
GhostDiagnostic-chr: 1.69
Centroid-sig: 0.9%
Centroid-so: 1.785 arcsec [1.72σ]
OotOffset-rm: 0.306 arcsec [0.62σ]
KicOffset-rm: 0.334 arcsec [0.68σ]
OotOffset-st: 4/2/3/4 [13]
KicOffset-st: 4/2/3/4 [13]
DiffImageQuality-fgm: 0.69 [9/13]
DiffImageOverlap-fno: 1.00 [17/17]

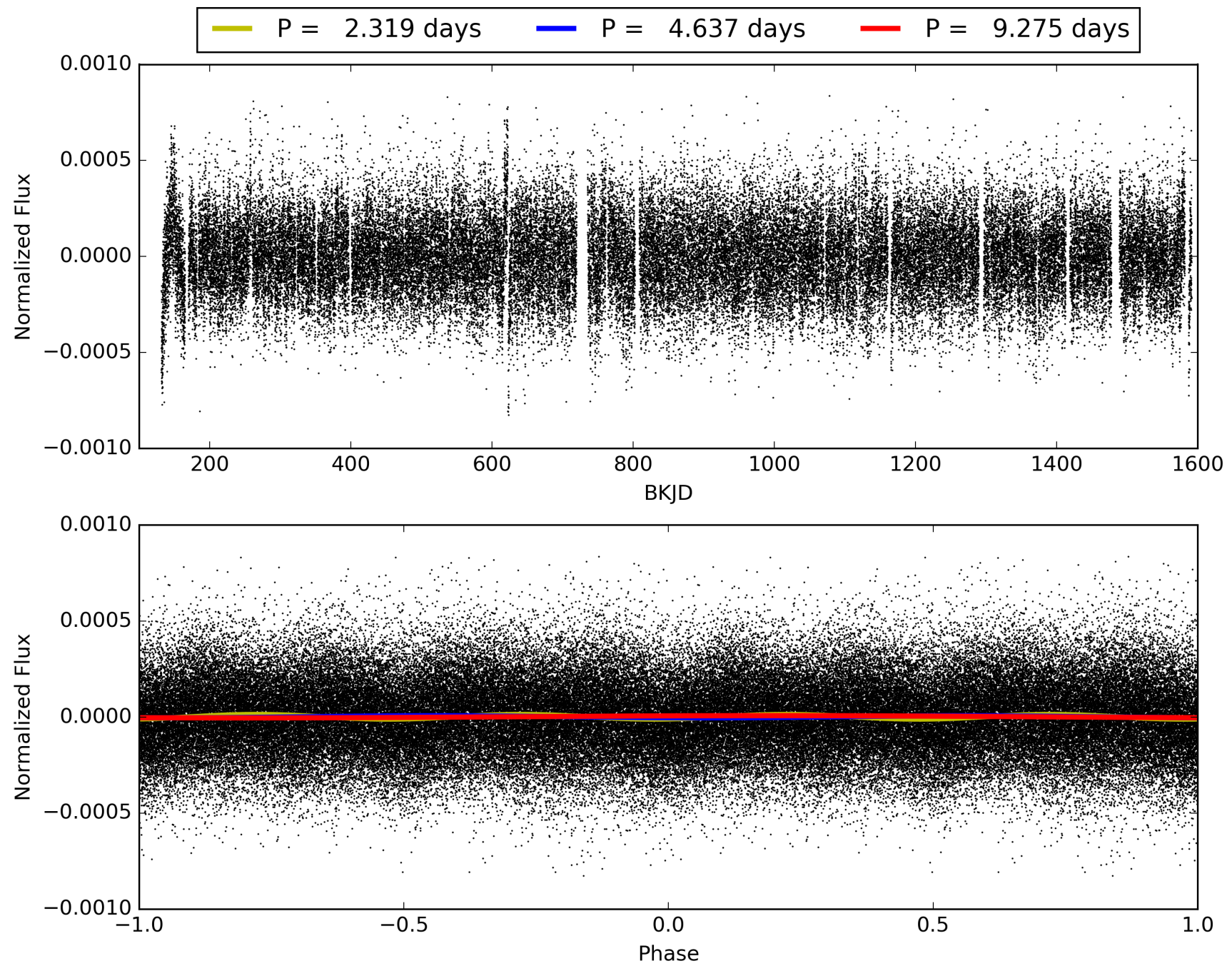
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 09:25:52 Z

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

TCE 010862759-02, PDC Light Curves

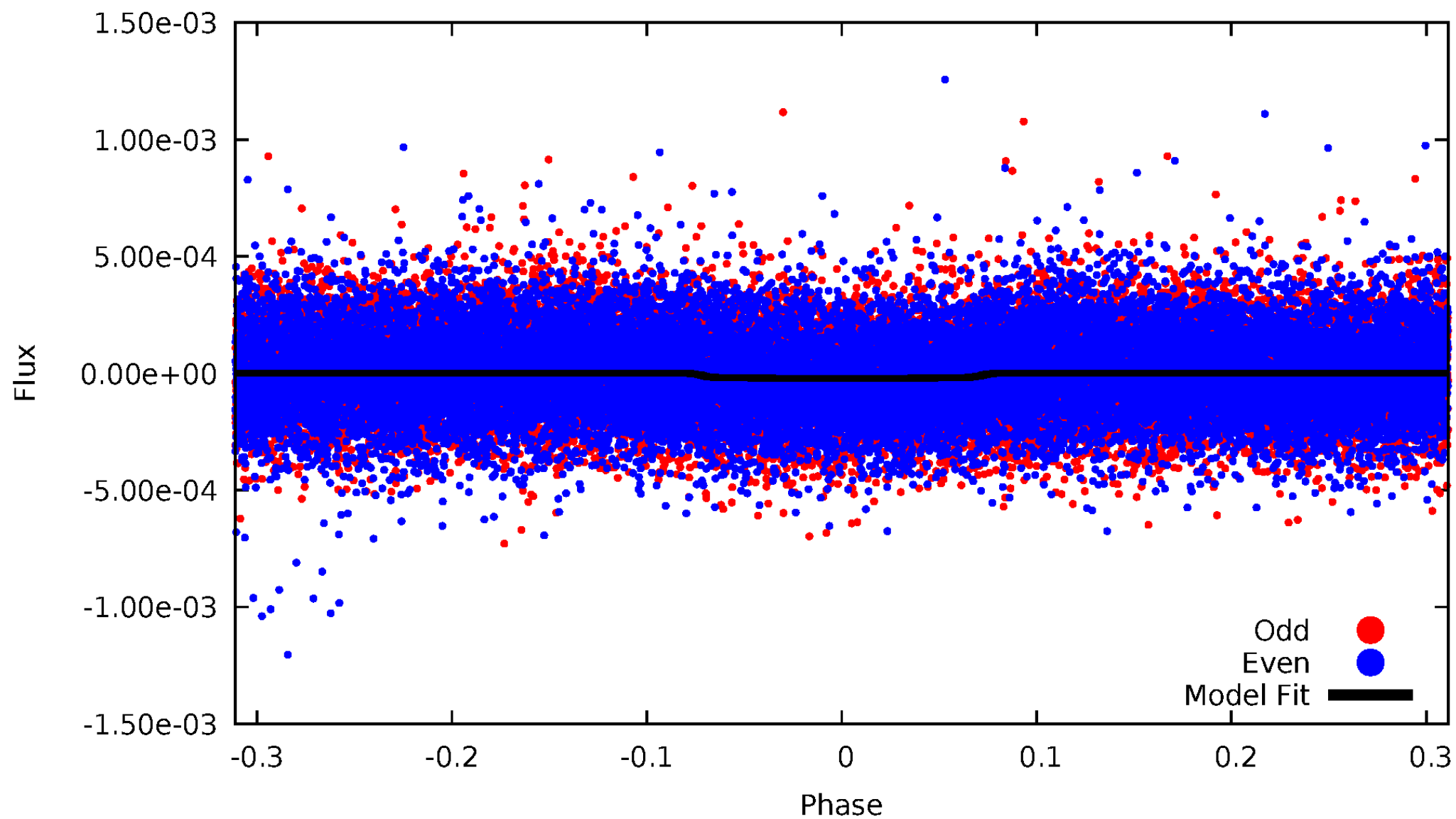


TCE 010862759-02



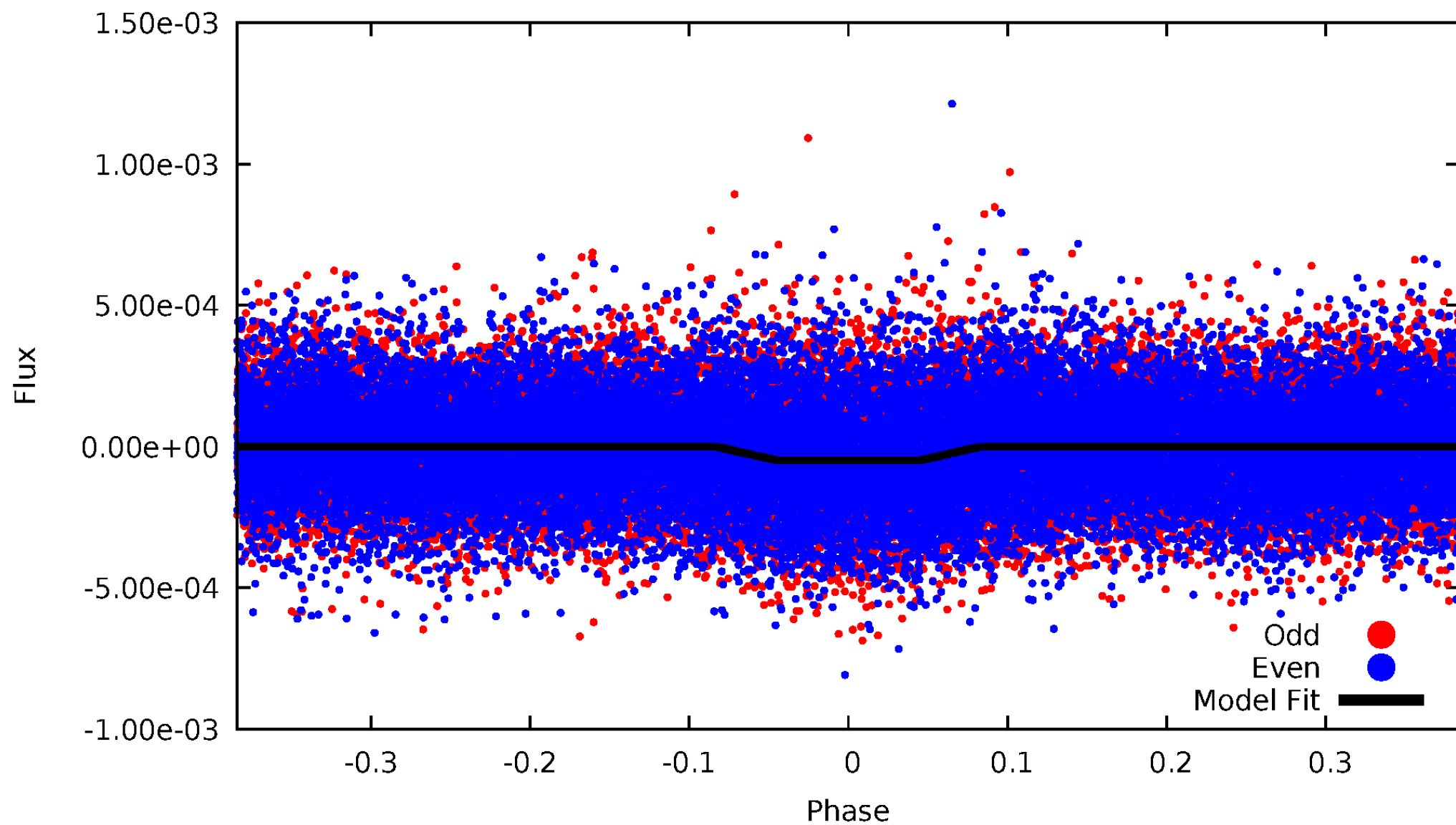
DV Odd/Even

TCE 010862759-02



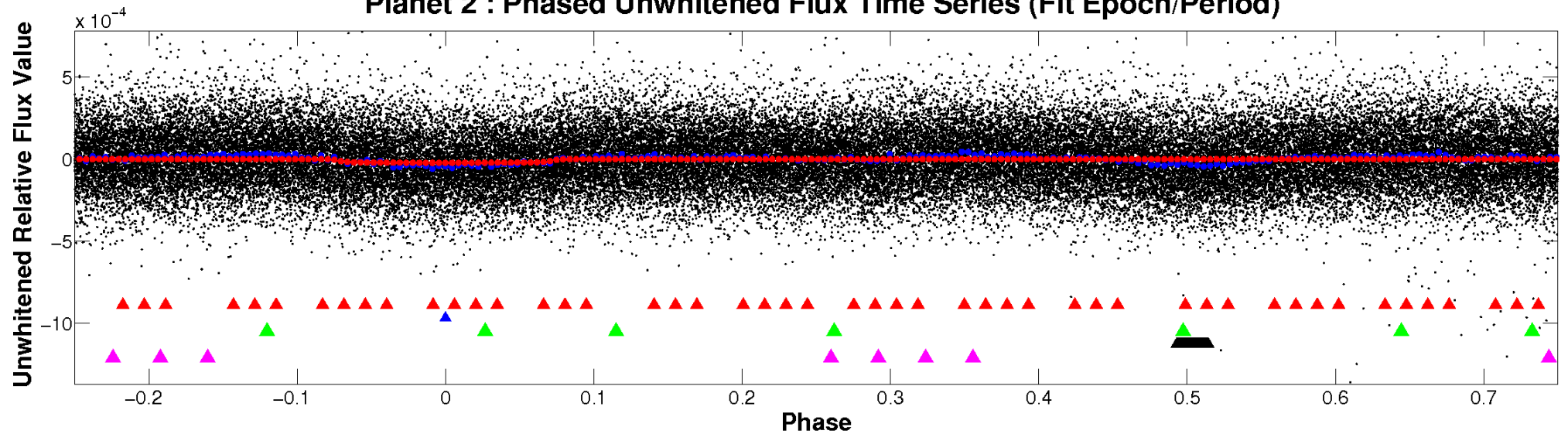
ALT Odd/Even

TCE 010862759-02

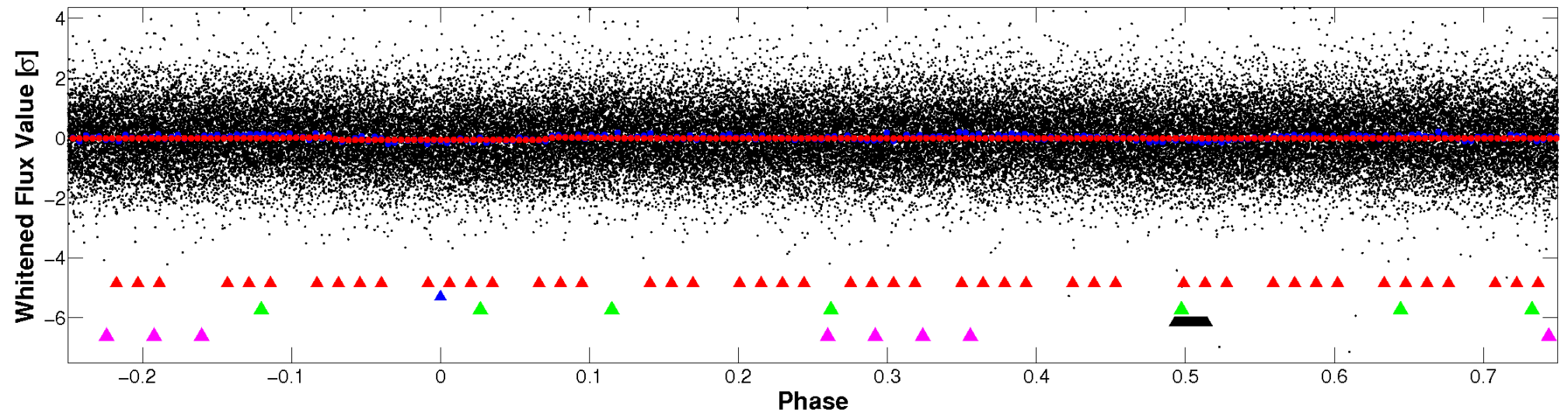


Non-Whitened Vs. Whitened Light Curve

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

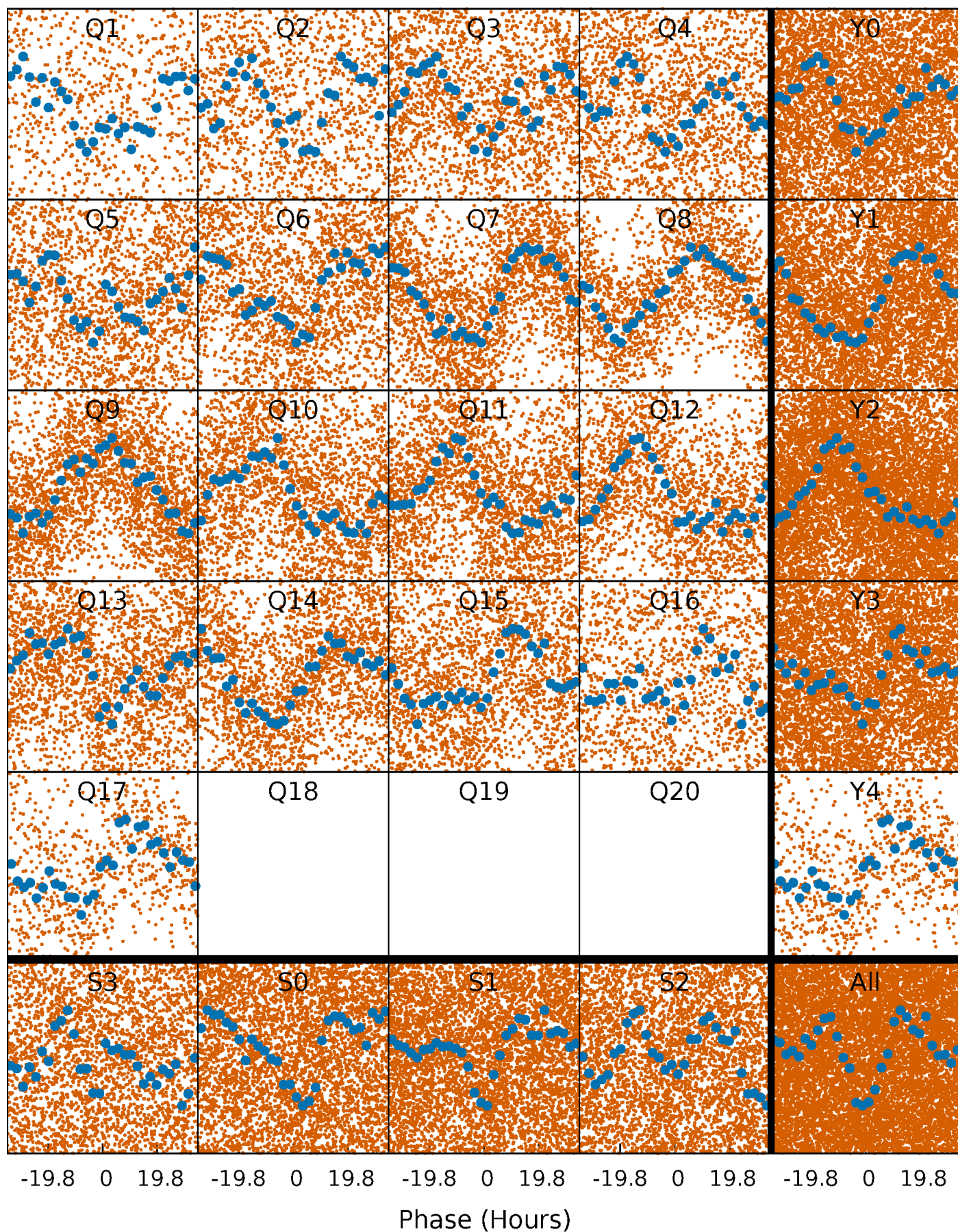


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



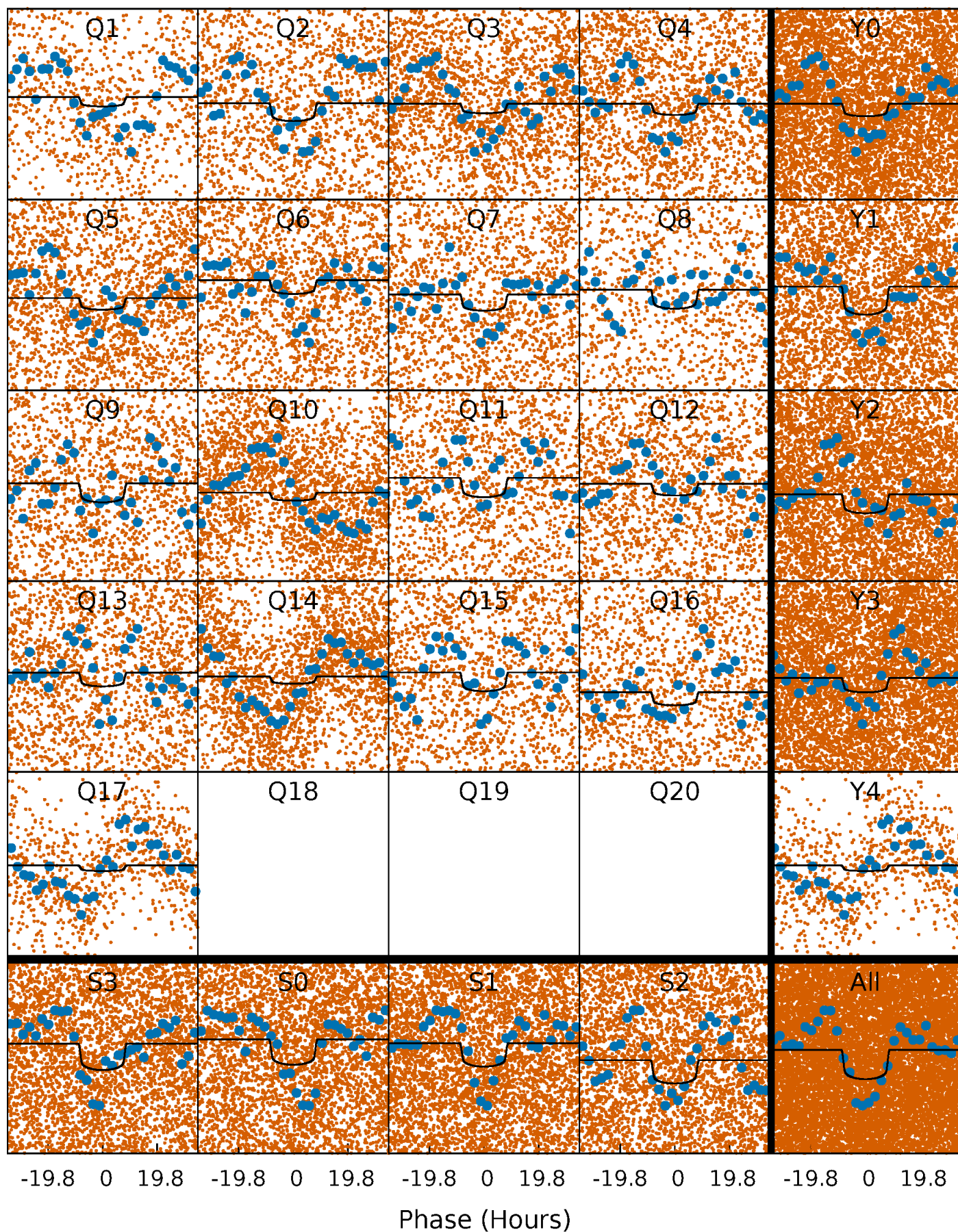
PDC Quarter-Phased Transit Curves

TCE 010862759-02 P= 4.637444 Days $T_0=132.384216$ (BKJD)



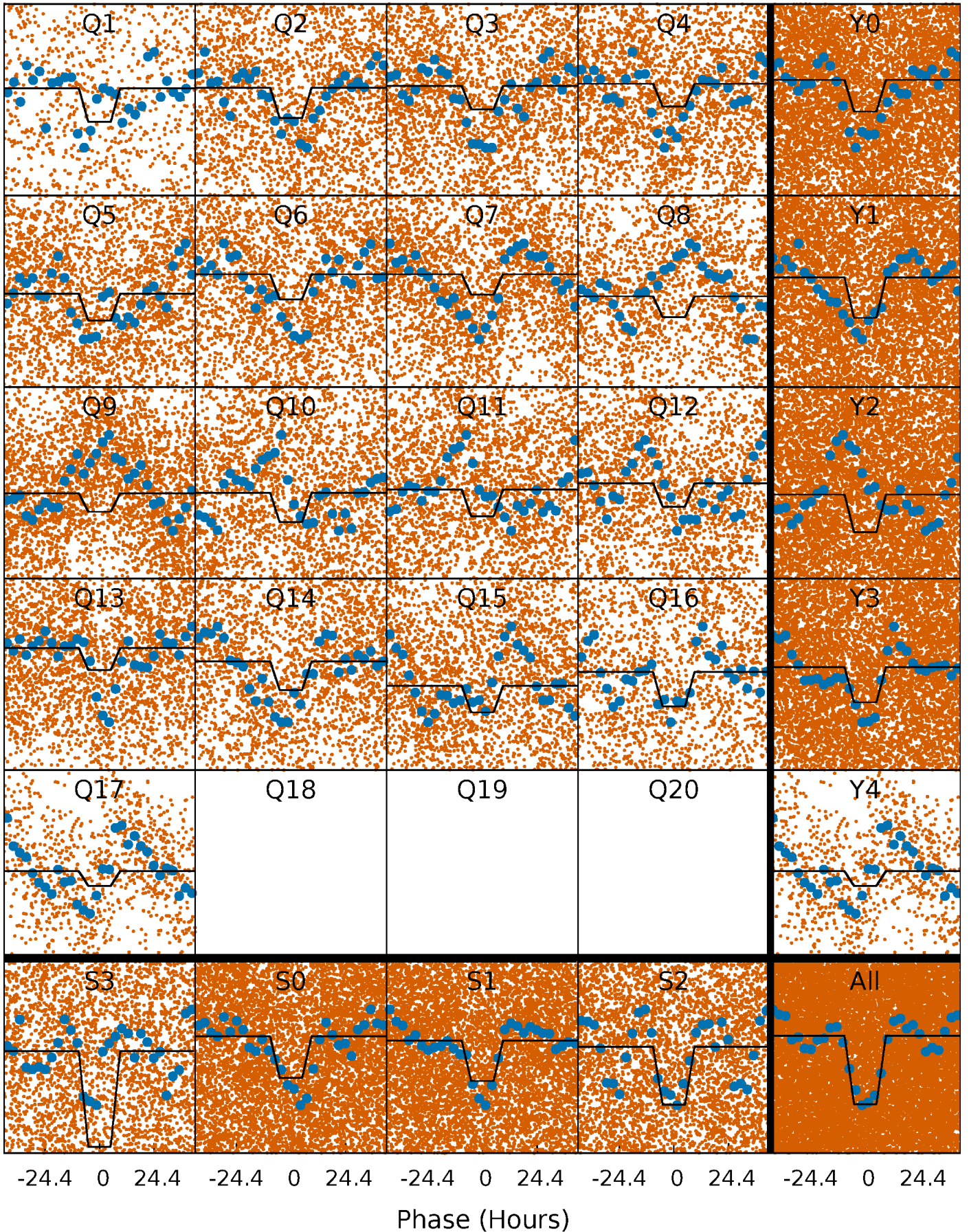
DV Quarter-Phased Transit Curves

TCE 010862759-02 P= 4.637444 Days $T_0=132.384216$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

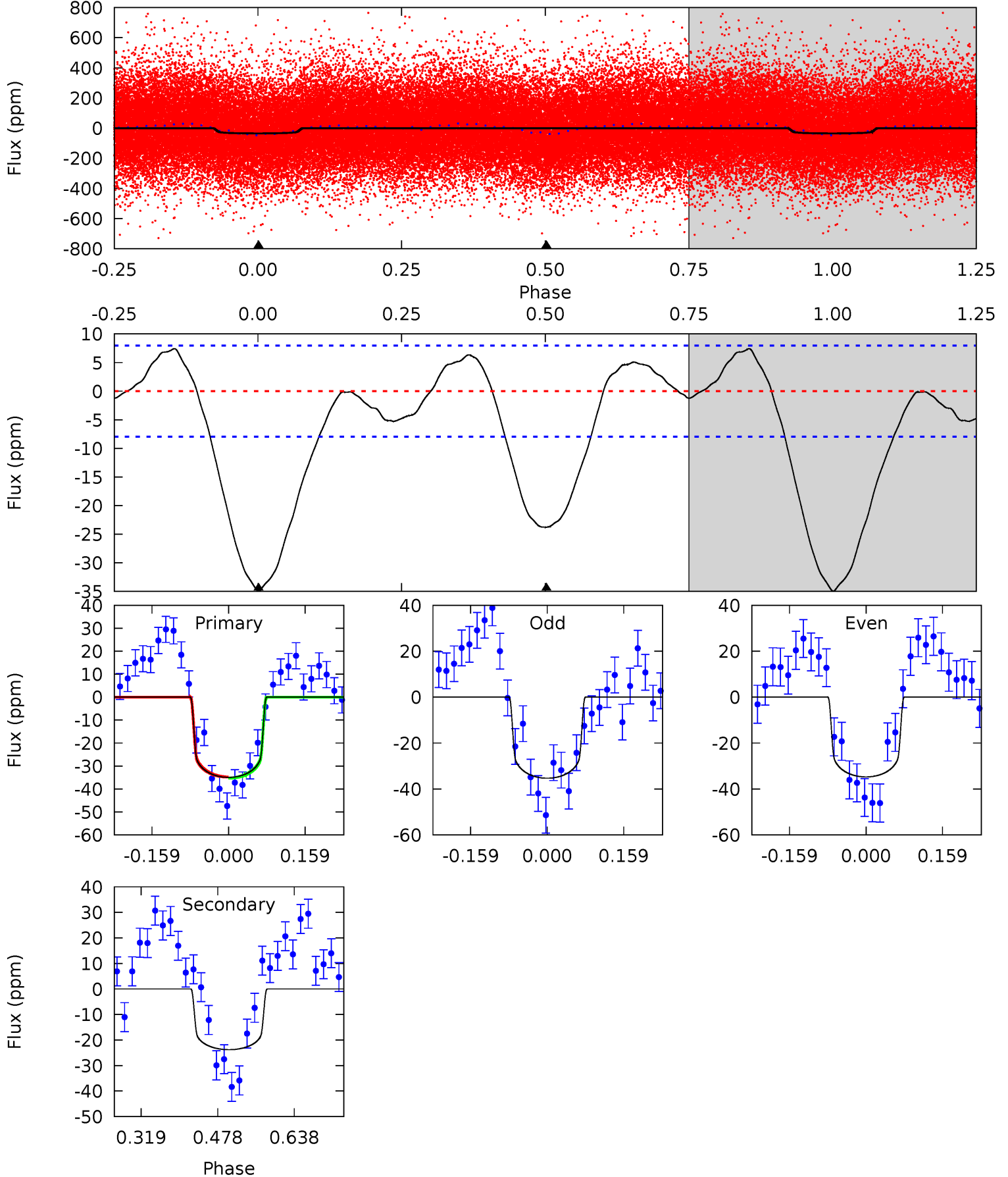
TCE 010862759-02 P= 4.637260 Days $T_0=132.384577$ (BKJD)



DV Model-Shift Uniqueness Test

010862759-02, P = 4.637444 Days, E = 127.746772 Days

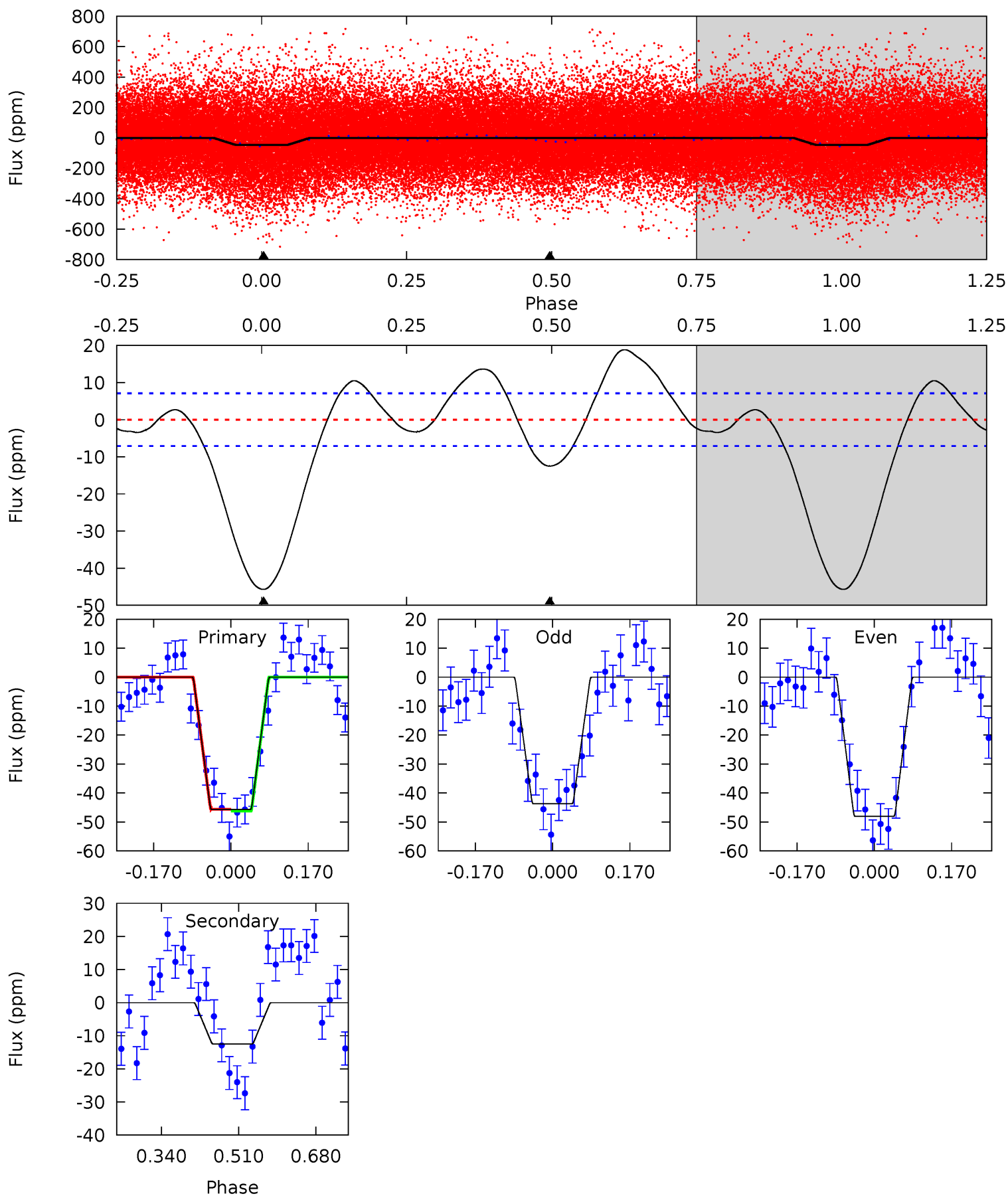
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.6	13.3	0	0	4.47	1.41	1.91	19.6	19.6	13.3	13.3	0.16	1.03	0.18	0.13



Alt Model-Shift Uniqueness Test

010862759-02, P = 4.637260 Days, E = 127.747317 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.7	7.84	0	0	4.45	1.37	2.99	28.7	28.7	7.84	7.84	1.37	0.83	0.29	0.19



Stellar Parameters For KIC 010862759

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6870^{+168}_{-264}	$4.266^{+0.087}_{-0.203}$	$-0.100^{+0.250}_{-0.350}$	$1.407^{+0.487}_{-0.209}$	$1.337^{+0.201}_{-0.201}$	$0.677^{+0.279}_{-0.378}$
	+2%/-4%	+2%/-5%	+250%/-350%	+35%/-15%	+15%/-15%	+41%/-56%
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 010862759-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-24 ± 2	$0.84^{+0.18}_{-0.13}$	2073^{+183}_{-113}	6525^{+539}_{-473}	65^{+26}_{-19}
Alt.	-12 ± 2	$1.09^{+0.21}_{-0.16}$	2061^{+148}_{-112}	4924^{+295}_{-261}	20^{+7}_{-6}

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

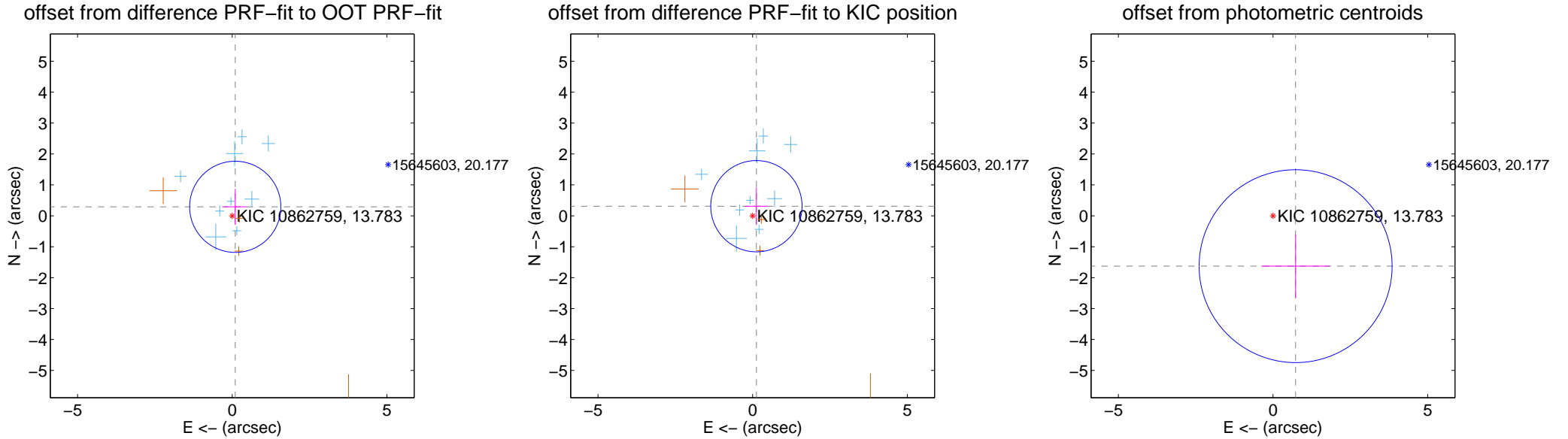
DV Centroid Data

Supplemental centroid analysis for 010862759-02. Kepler magnitude: 13.78. Transit SNR 5.87

There are 9 quarters with good PRF difference image offsets

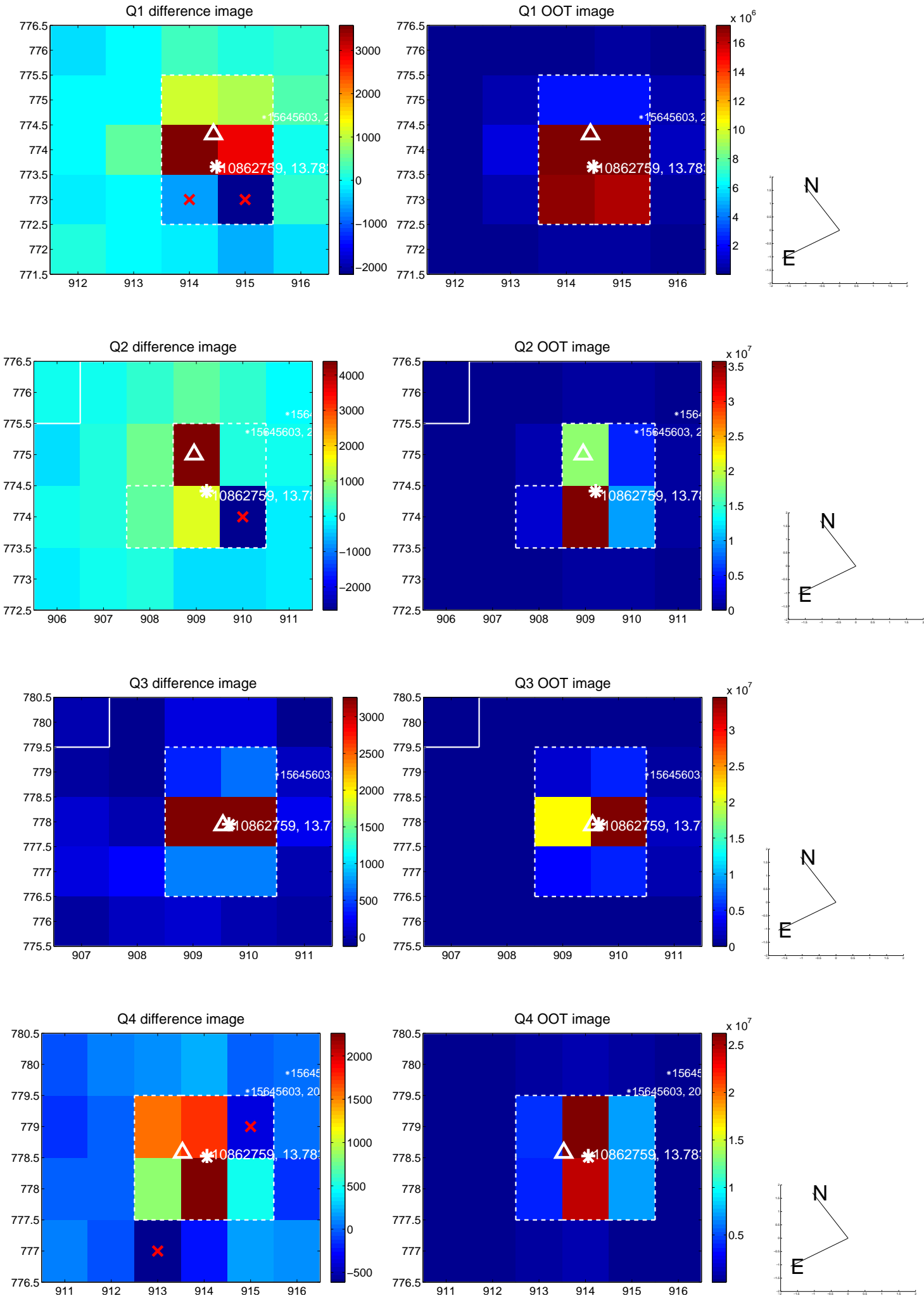
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.306 ± 0.492	0.62	-0.096 ± 0.379	0.291 ± 0.583
PRF-fit source offset from KIC position	0.334 ± 0.492	0.68	-0.121 ± 0.364	0.311 ± 0.606
photometric centroid source offset	1.78 ± 1.04	1.72	-0.73 ± 1.11	-1.63 ± 1.03

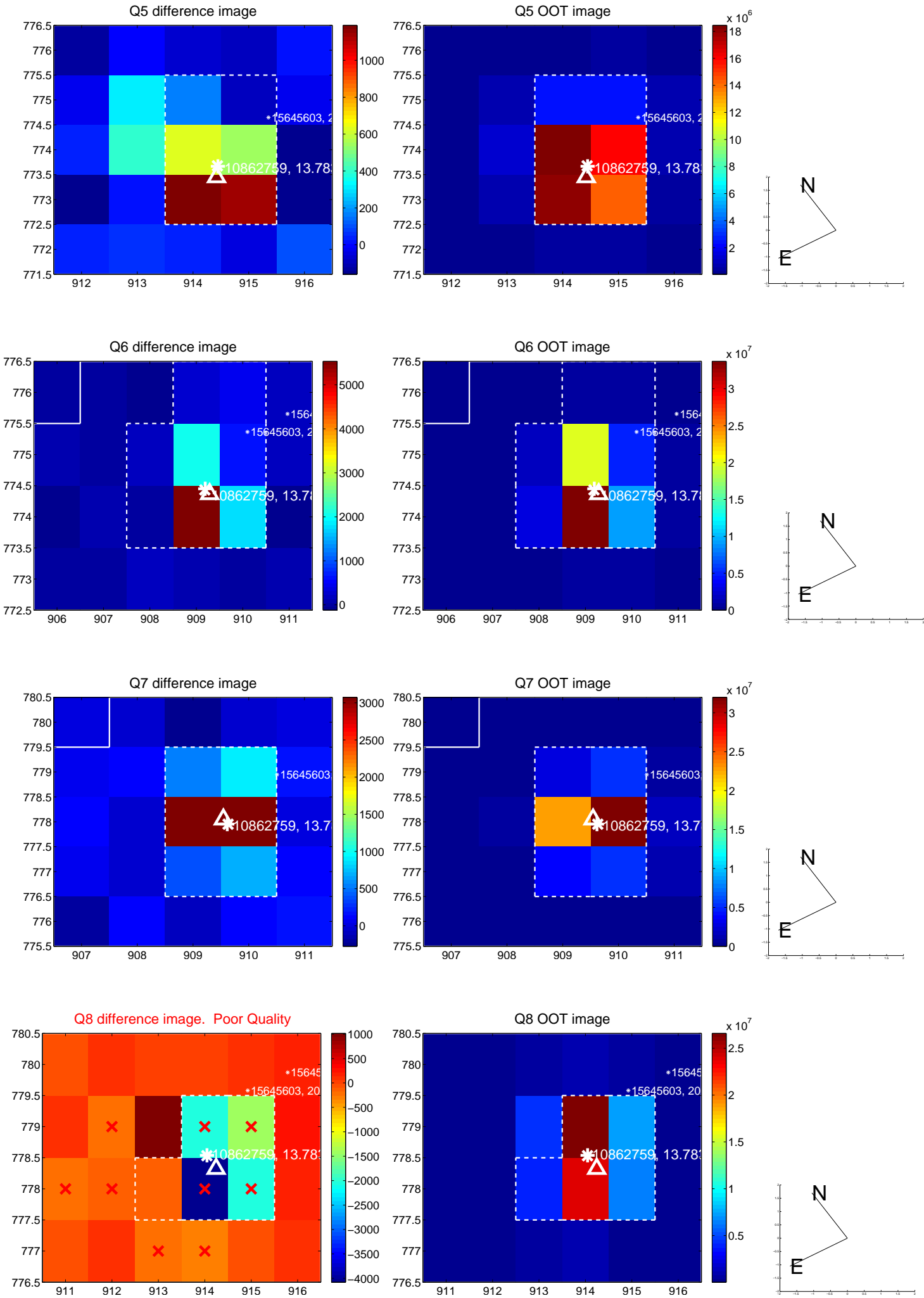


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

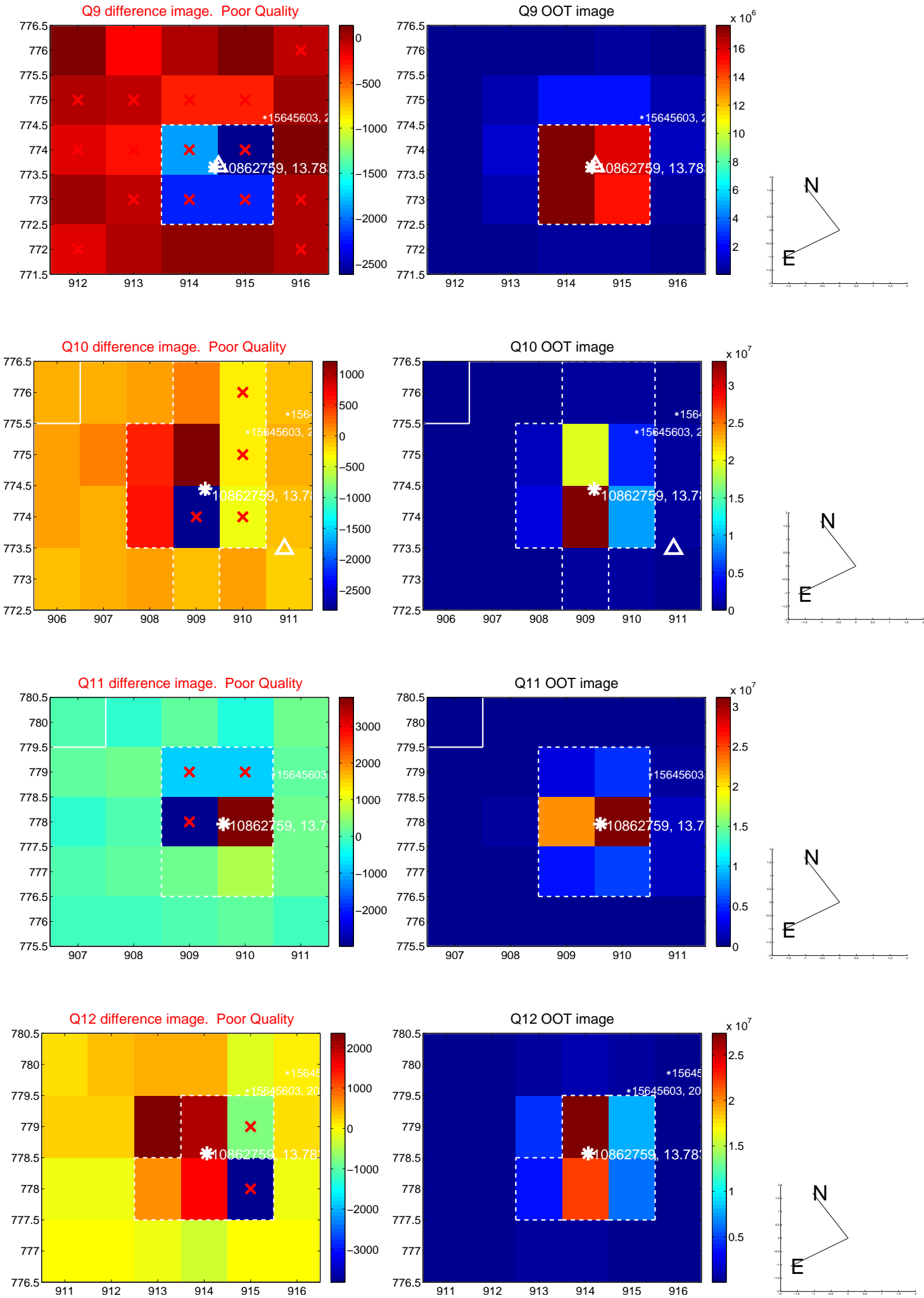
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



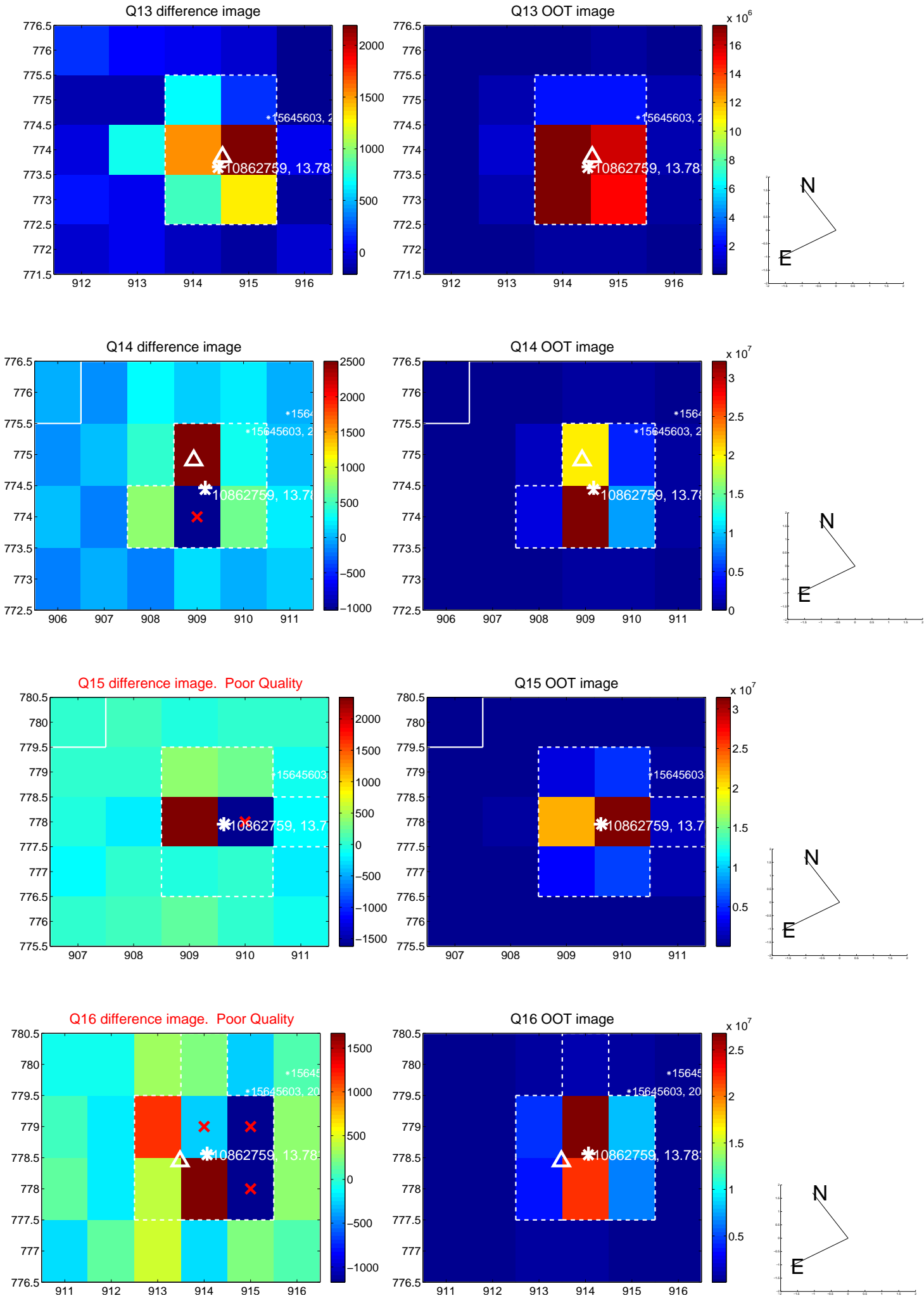
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



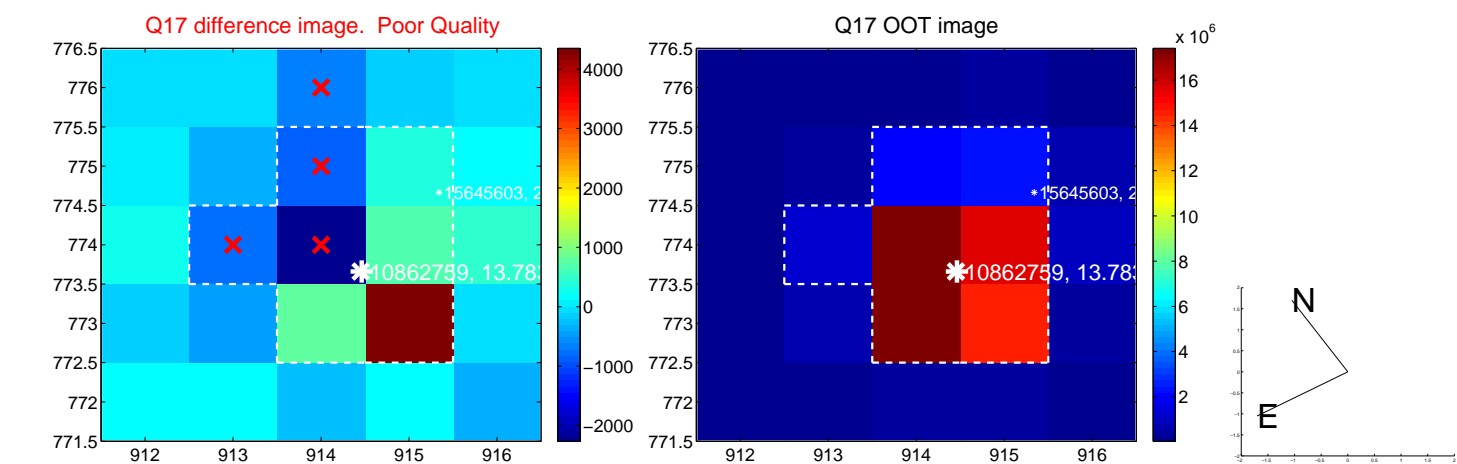
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



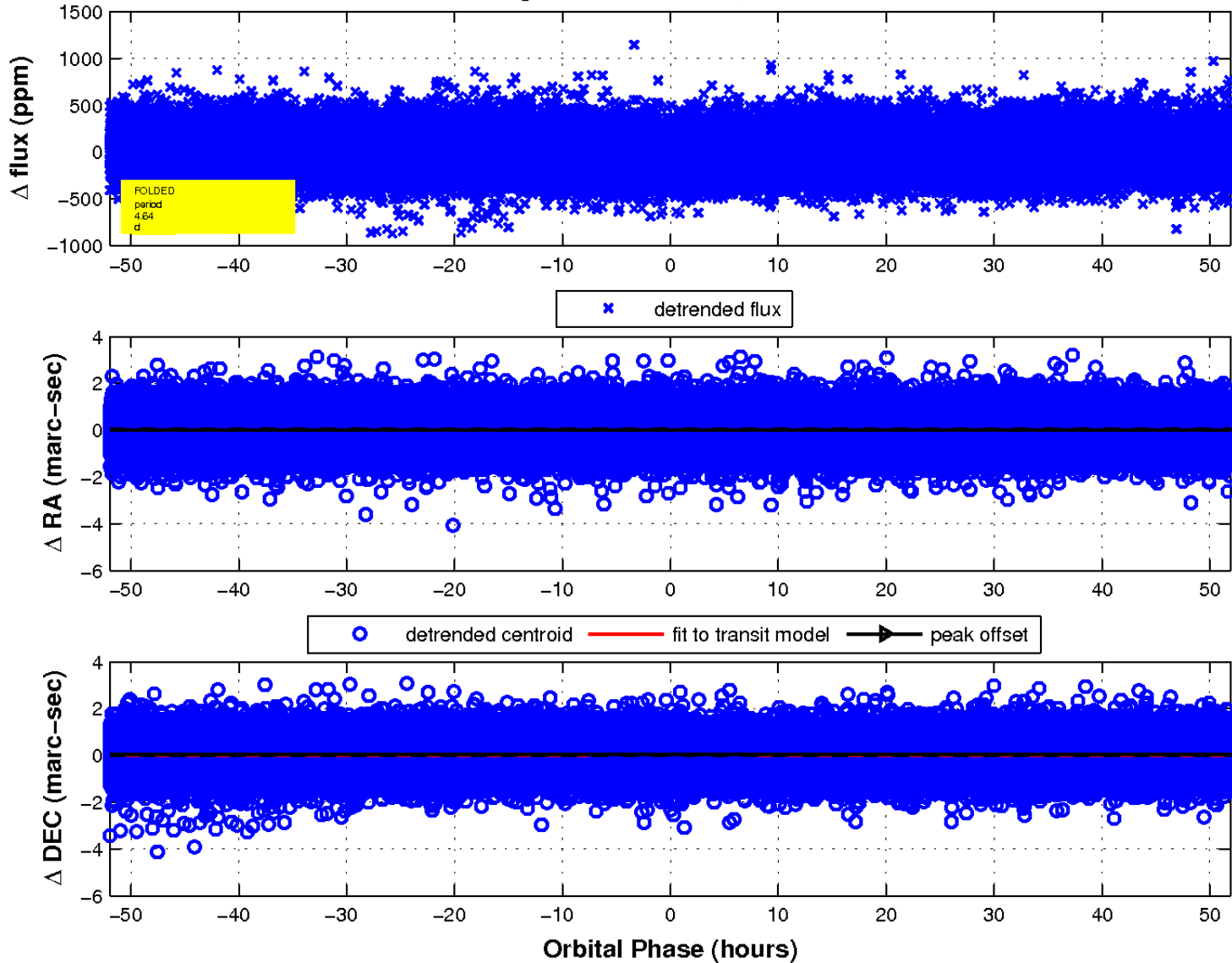
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



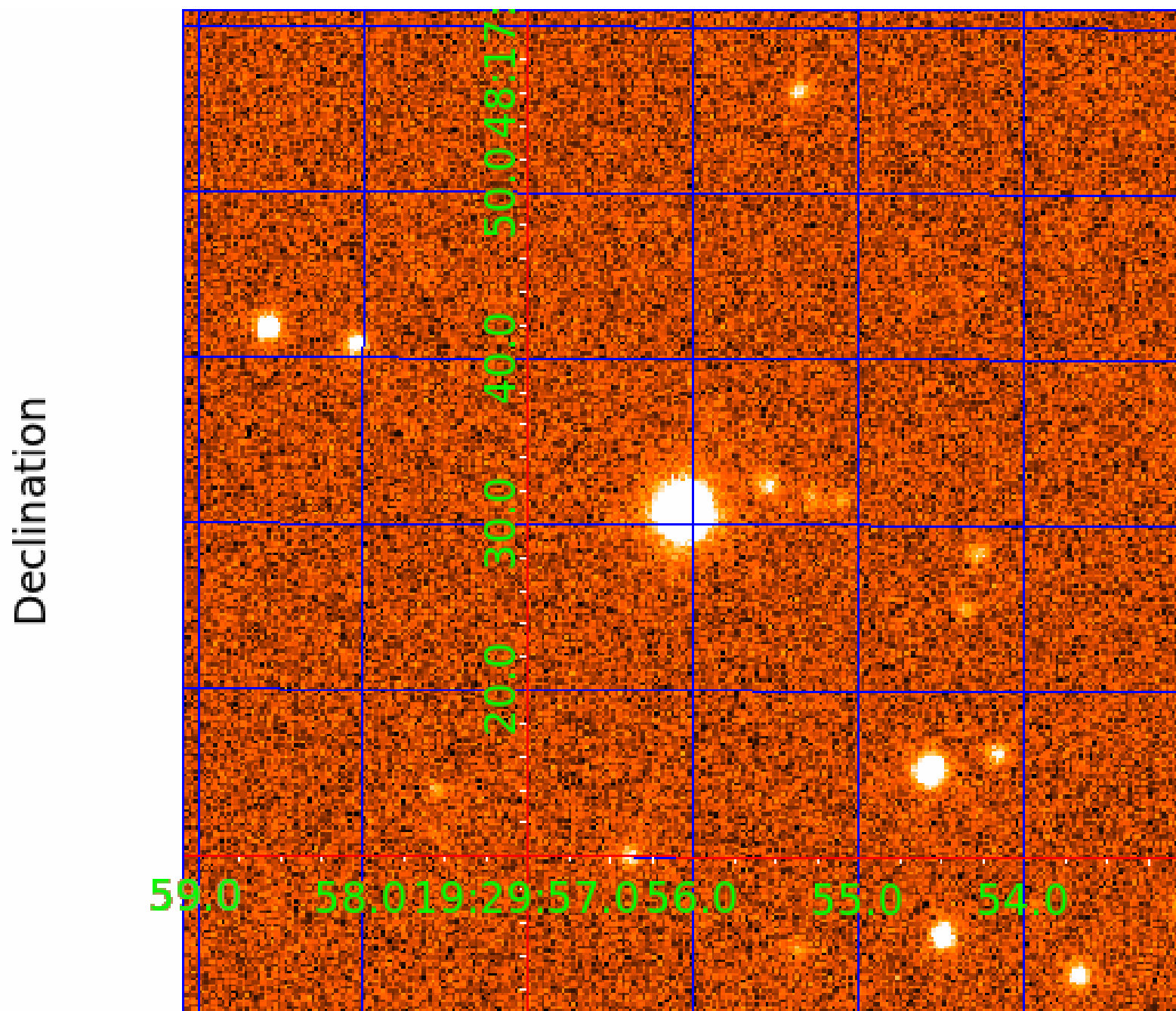
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 5



UKIRT Image



KIC 010862759

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})
010862759-01	OBS	8035.01	29.485669	151.865142	111.2	4.394	8.3	8.5	1.41	6870	1.70	93.49
010862759-02	OBS	No	4.637444	132.384216	21.9	17.312	7.7	5.9	1.41	6870	0.82	1101.23
010862759-03	OBS	No	206.911847	183.520322	201.3	7.412	10.7	6.1	1.41	6870	2.28	6.96
010862759-04	OBS	No	4.637125	134.770067	36.5	13.145	9.5	10.2	1.41	6870	0.96	1101.33
010862759-05	OBS	No	192.379959	208.232568	149.2	11.834	9.8	4.9	1.41	6870	1.75	7.67

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010862759-01	OBS	PC	0.85	0	0	0	0	NO_COMMENT
010862759-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
010862759-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010862759-04	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD
010862759-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST

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

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

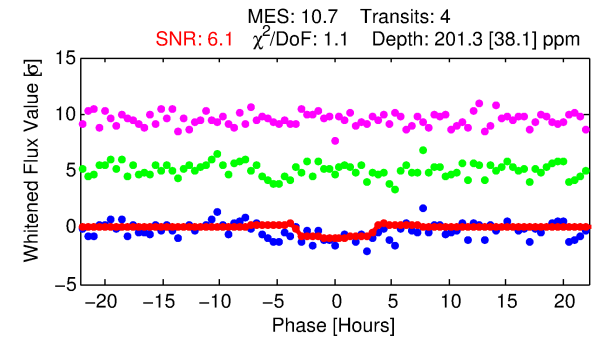
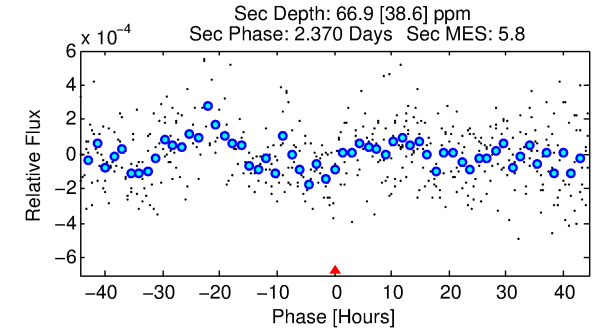
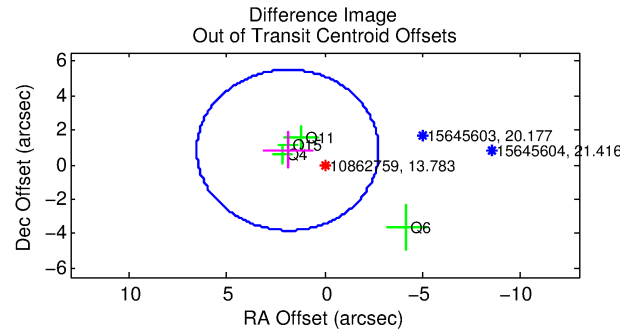
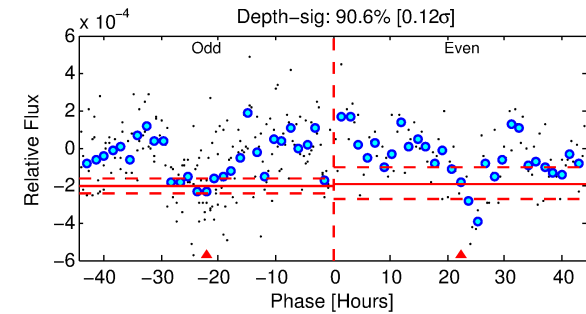
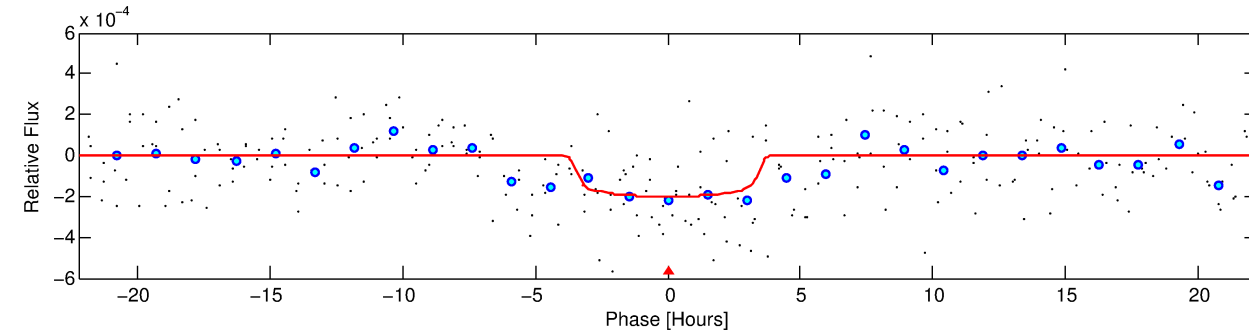
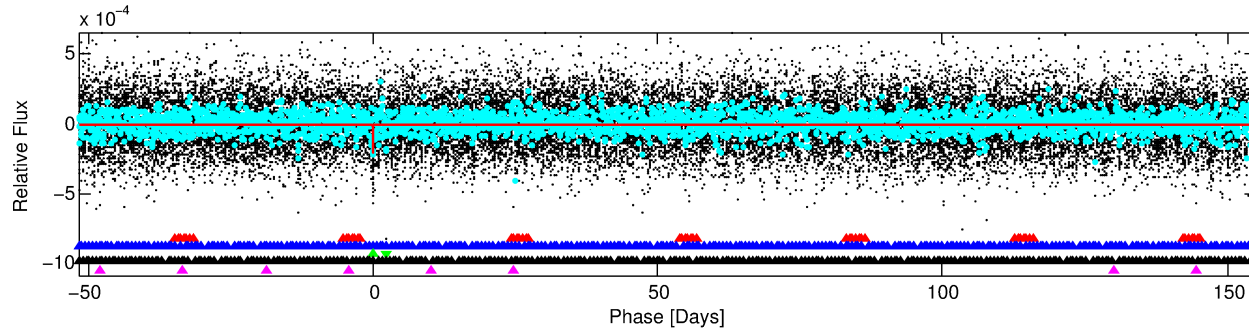
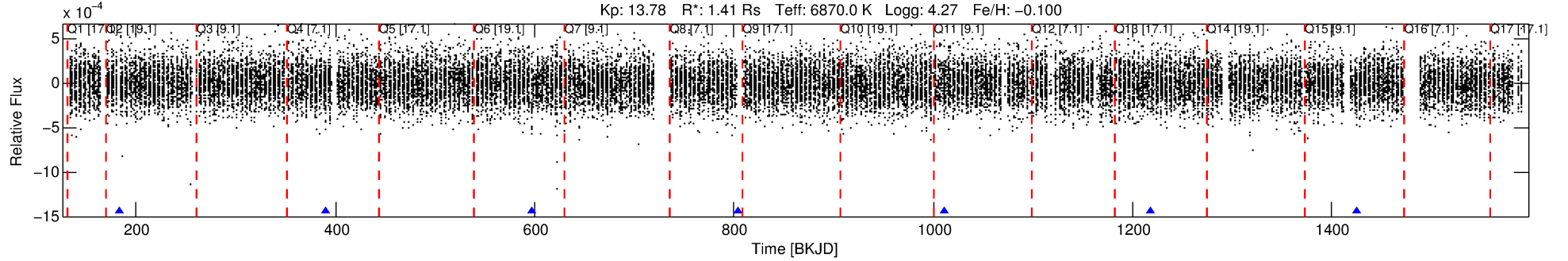
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010862759-03

No Significant Match Found

DV One-Page Summary

KIC: 10862759 Candidate: 3 of 5 Period: 206.912 d



DV Fit Results:

Period = 206.91185 [0.00649] d
Epoch = 183.5203 [0.0239] BKJD
Rp/R* = 0.0149 [0.0043]
a/R* = 109.67 [173.20]
b = 0.87 [0.42]
Seff = 6.96 [2.90]
Teq = 414 [43] K
Rp = 2.28 [1.03] Re
a = 0.7535 [0.2098] AU
Ag = 4008.93 [3631.36] [1.10 σ]
Teffp = 5095 [1061] K [4.41 σ]

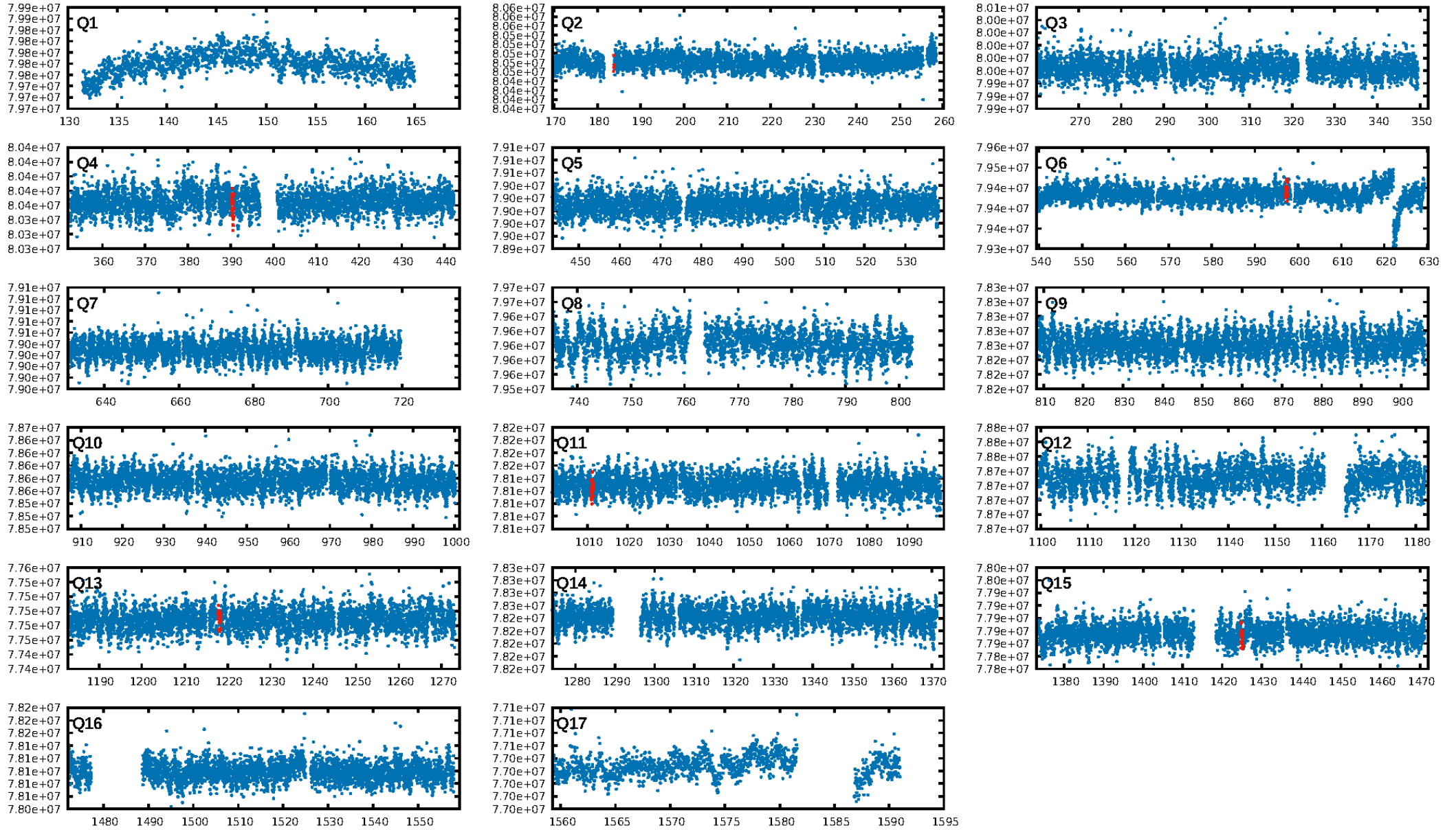
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [24.98 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 12.1%
ModelChiSquareGof-sig: 86.6%
Bootstrap-pfa: 2.19e-19
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 7.534
Centroid-sig: 48.2%
Centroid-so: 0.924 arcsec [0.68 σ]
OotOffset-rm: 2.063 arcsec [1.33 σ]
OotOffset-st: 1/2/1/0 [4]
KicOffset-rm: 2.102 arcsec [1.31 σ]
KicOffset-st: 1/2/1/0 [4]
DiffImageQuality-fgm: 0.50 [2/4]
DiffImageOverlap-fno: 0.50 [2/4]

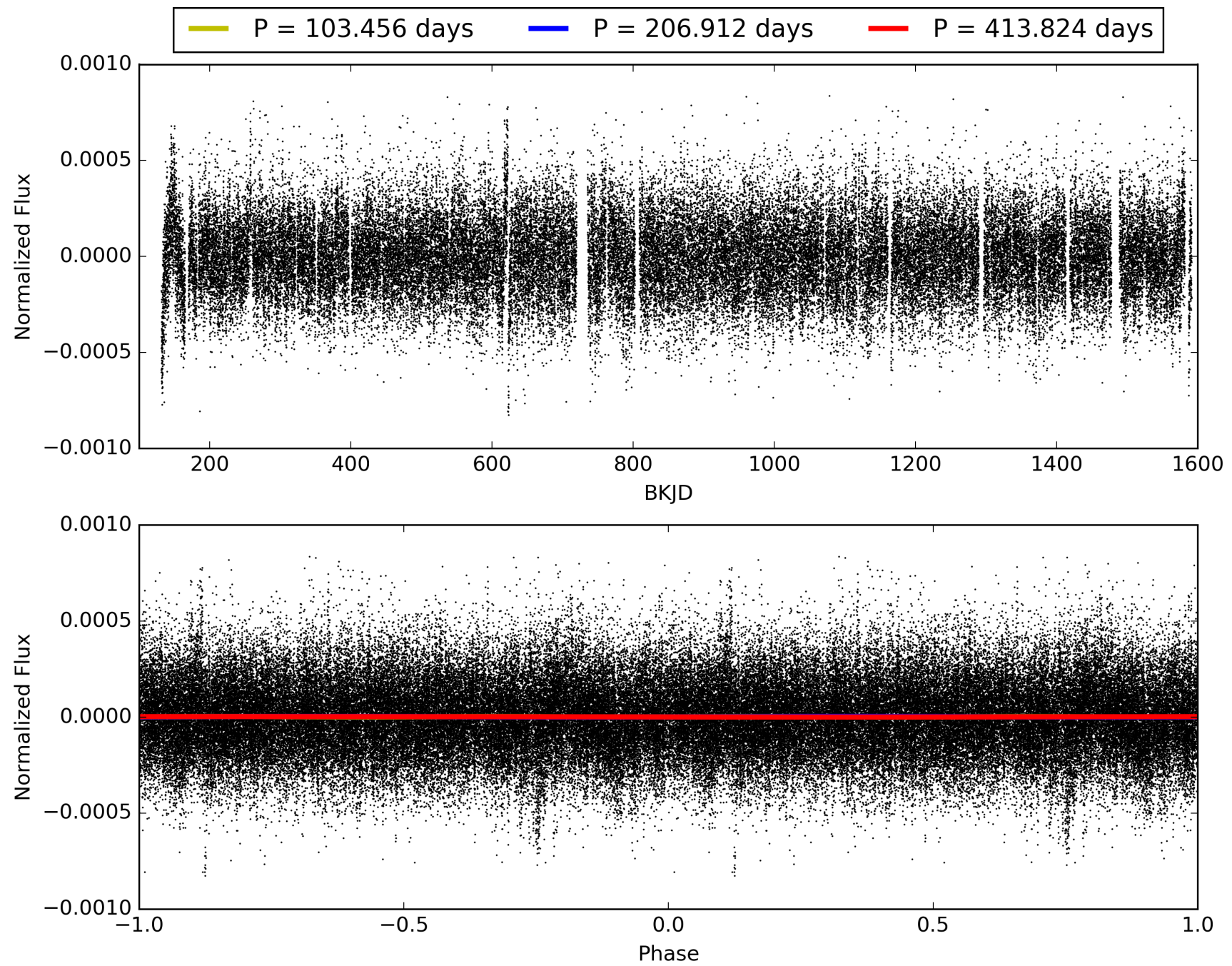
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 09:26:03 Z

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

TCE 010862759-03, PDC Light Curves

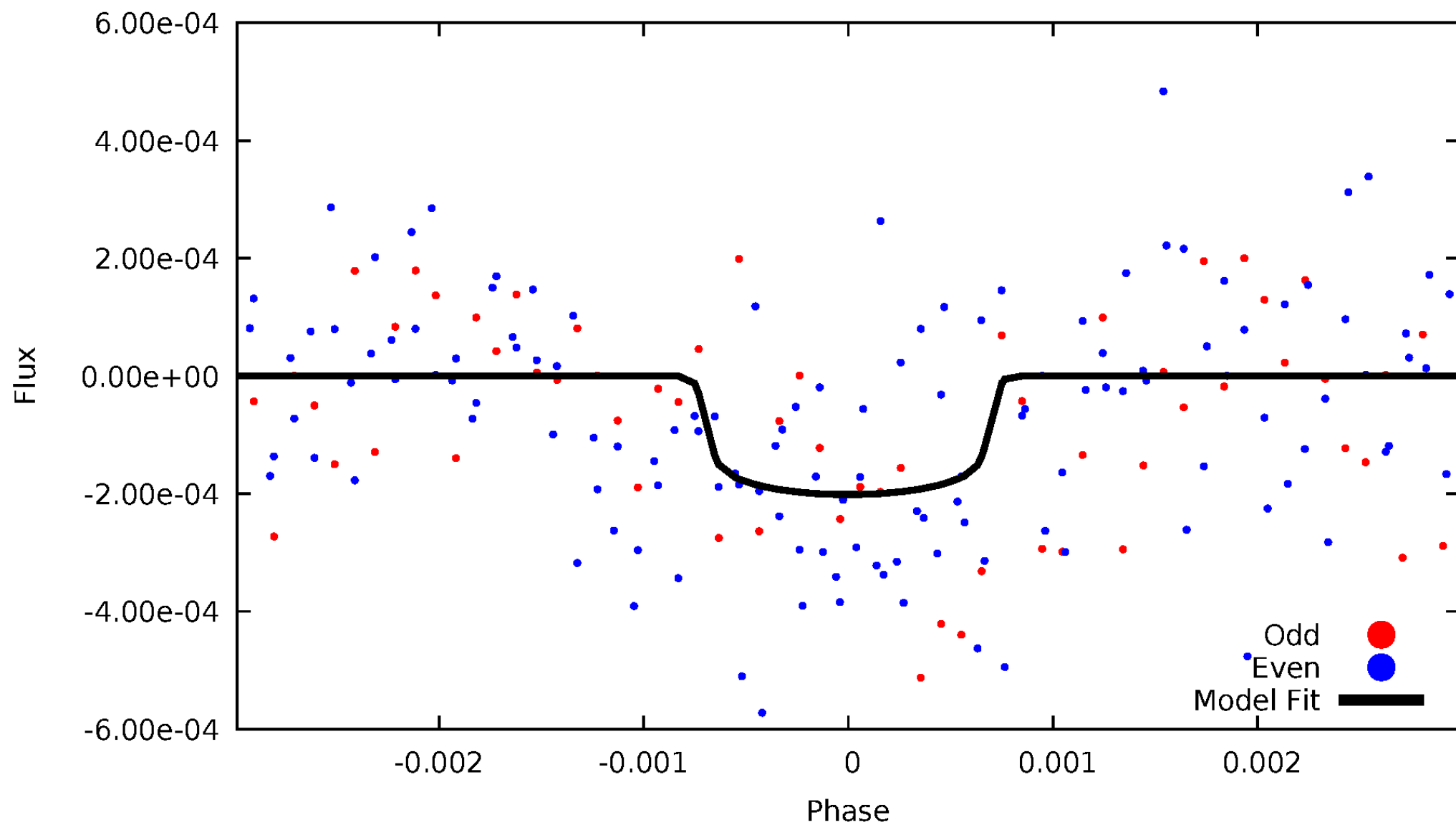


TCE 010862759-03



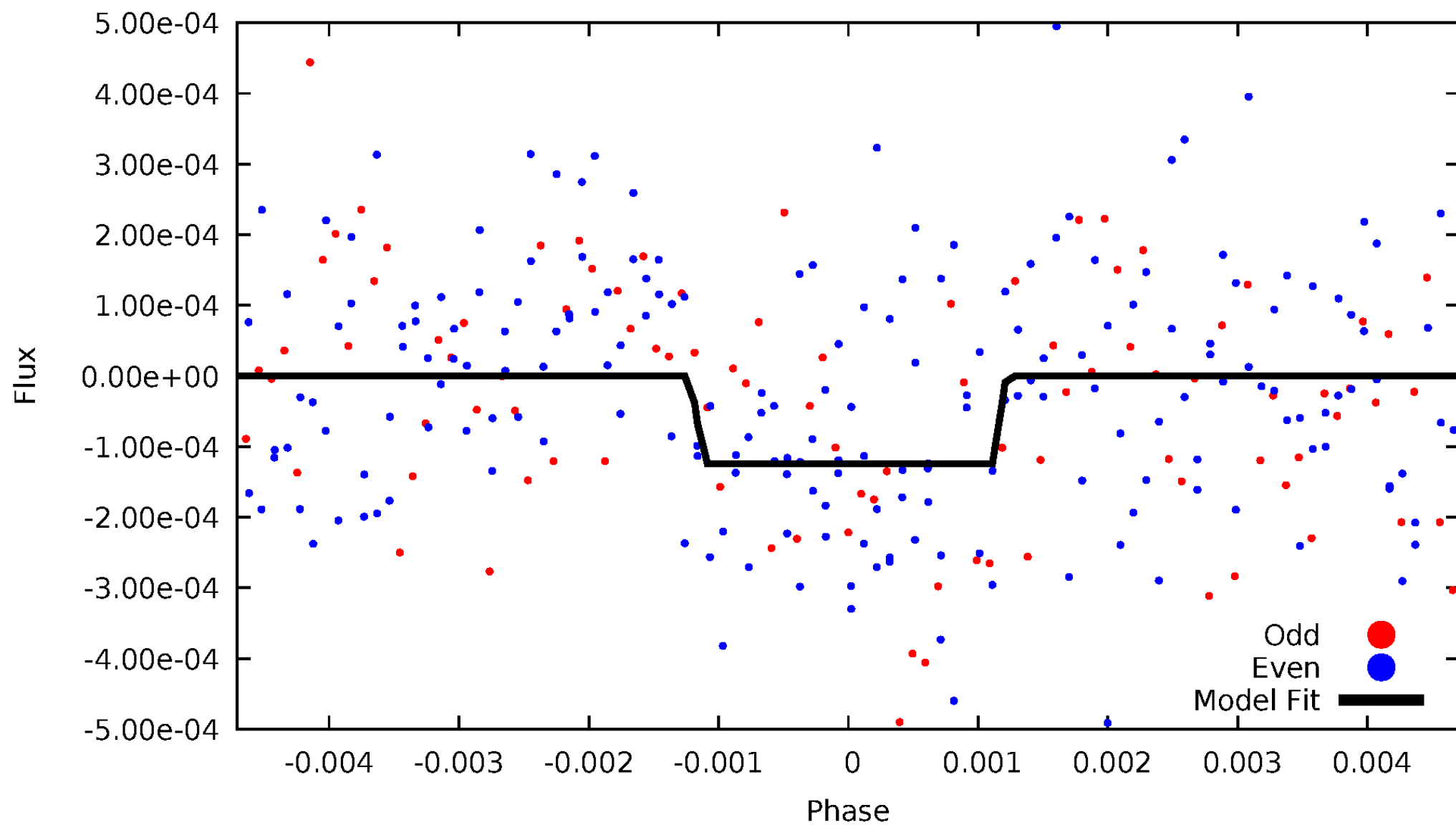
DV Odd/Even

TCE 010862759-03



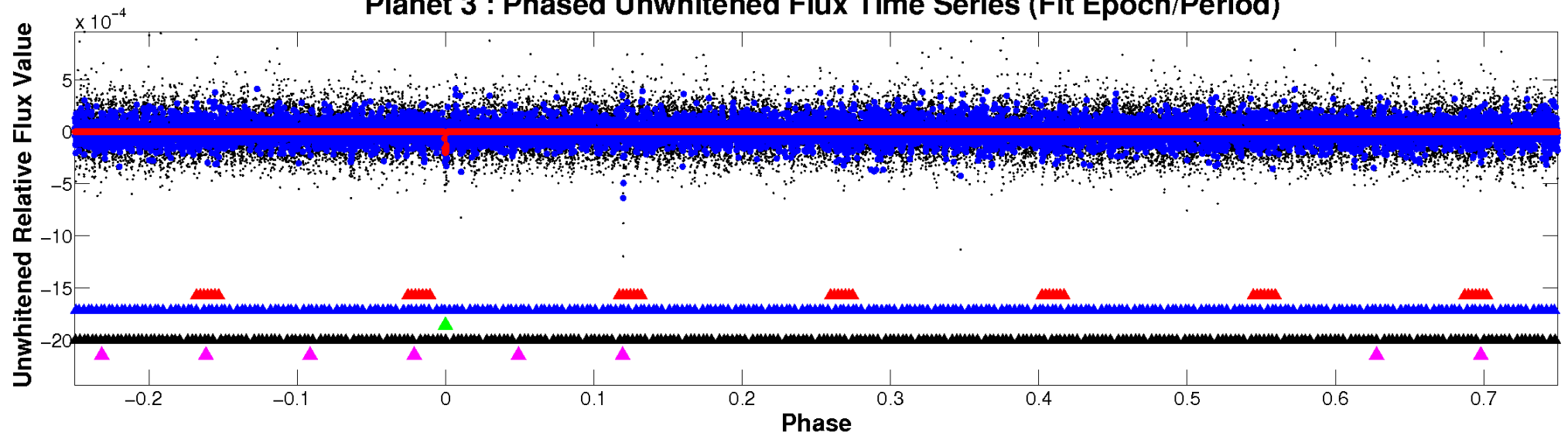
ALT Odd/Even

TCE 010862759-03

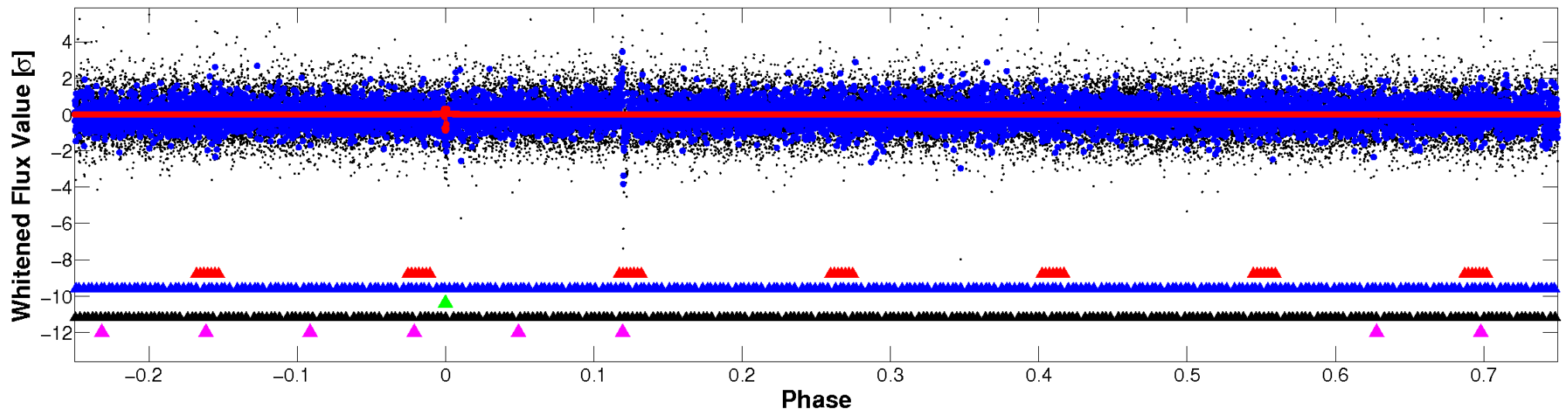


Non-Whitened Vs. Whitened Light Curve

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

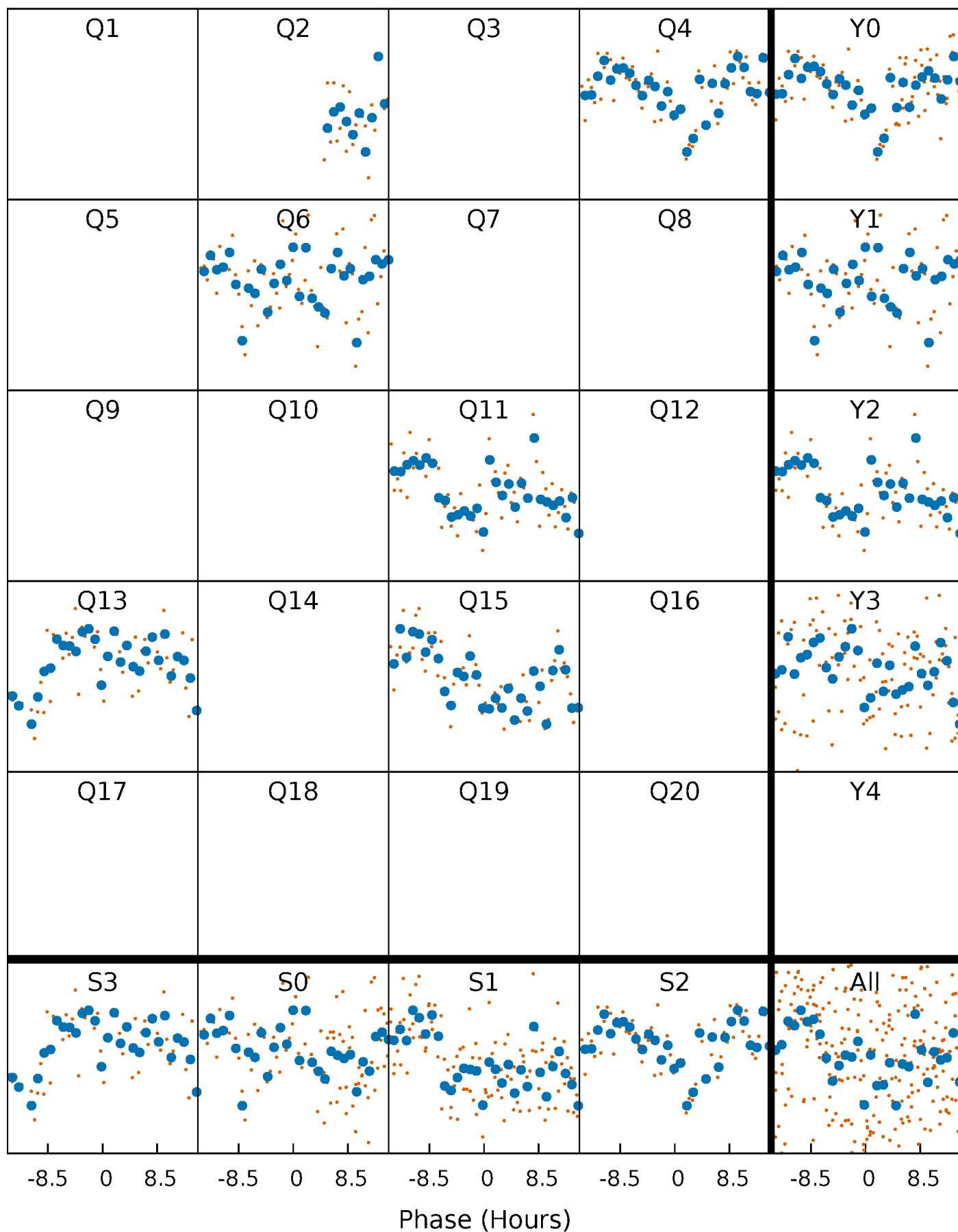


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



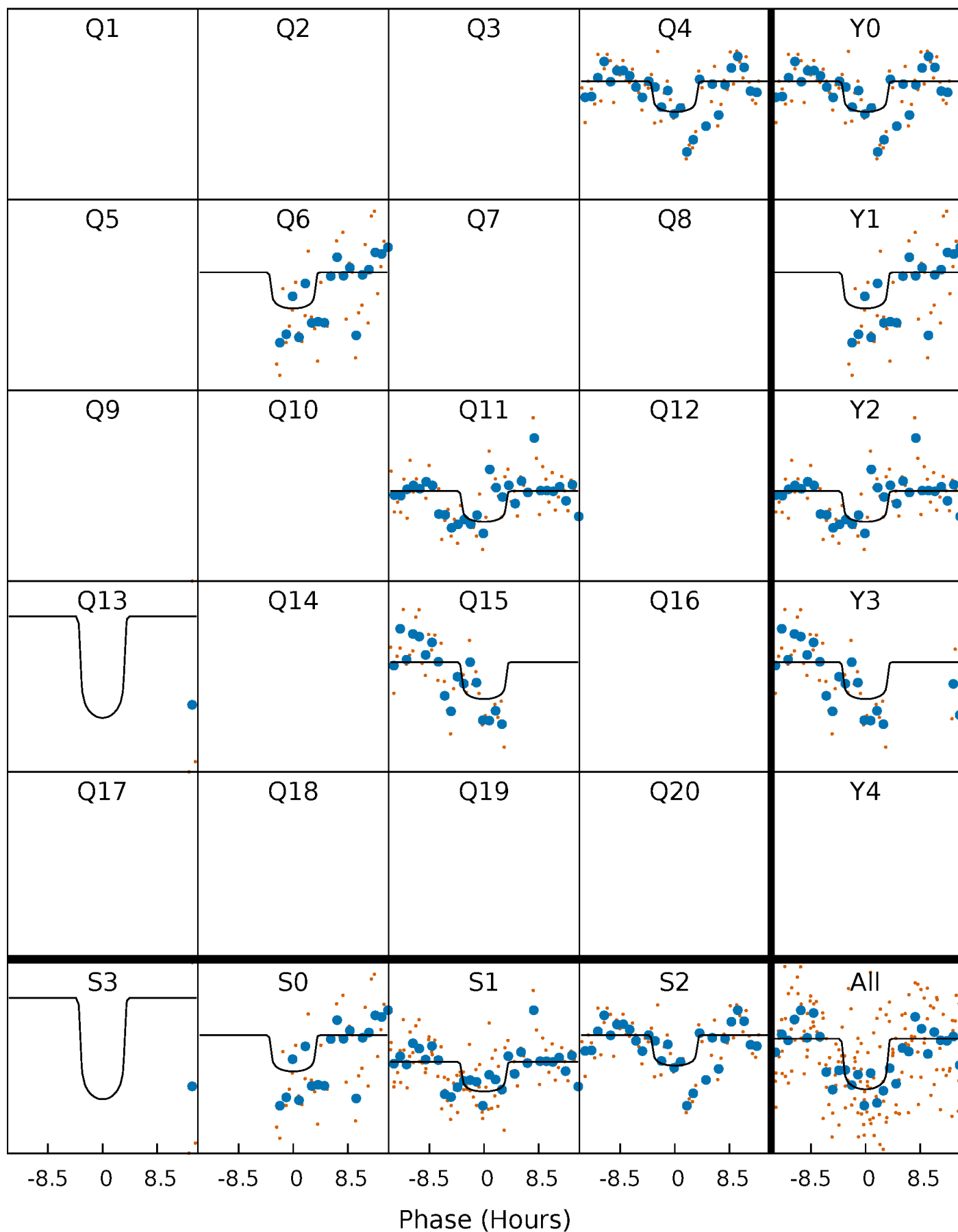
PDC Quarter-Phased Transit Curves

TCE 010862759-03 P=206.911847 Days $T_0=183.520322$ (BKJD)



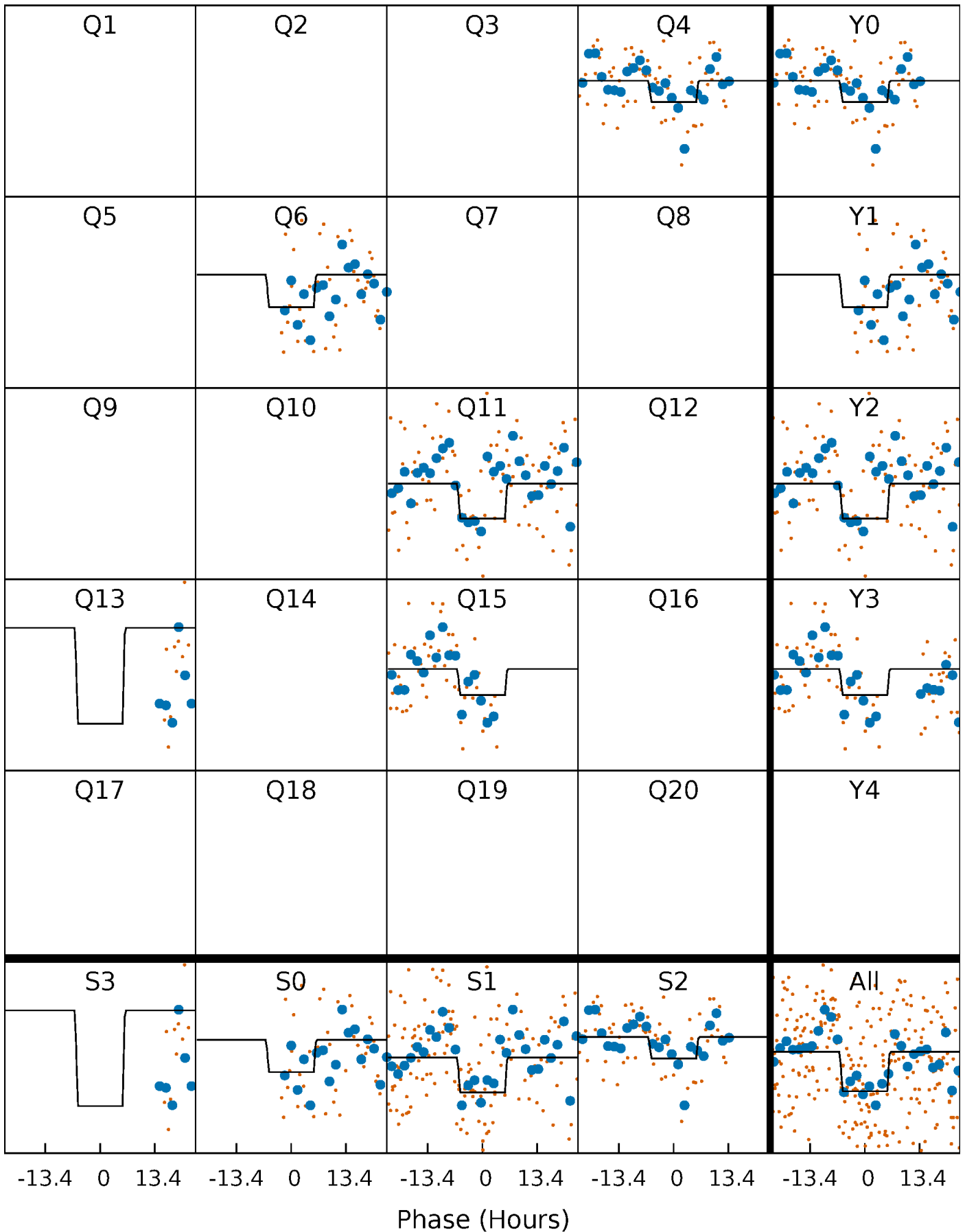
DV Quarter-Phased Transit Curves

TCE 010862759-03 P=206.911847 Days $T_0=183.520322$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

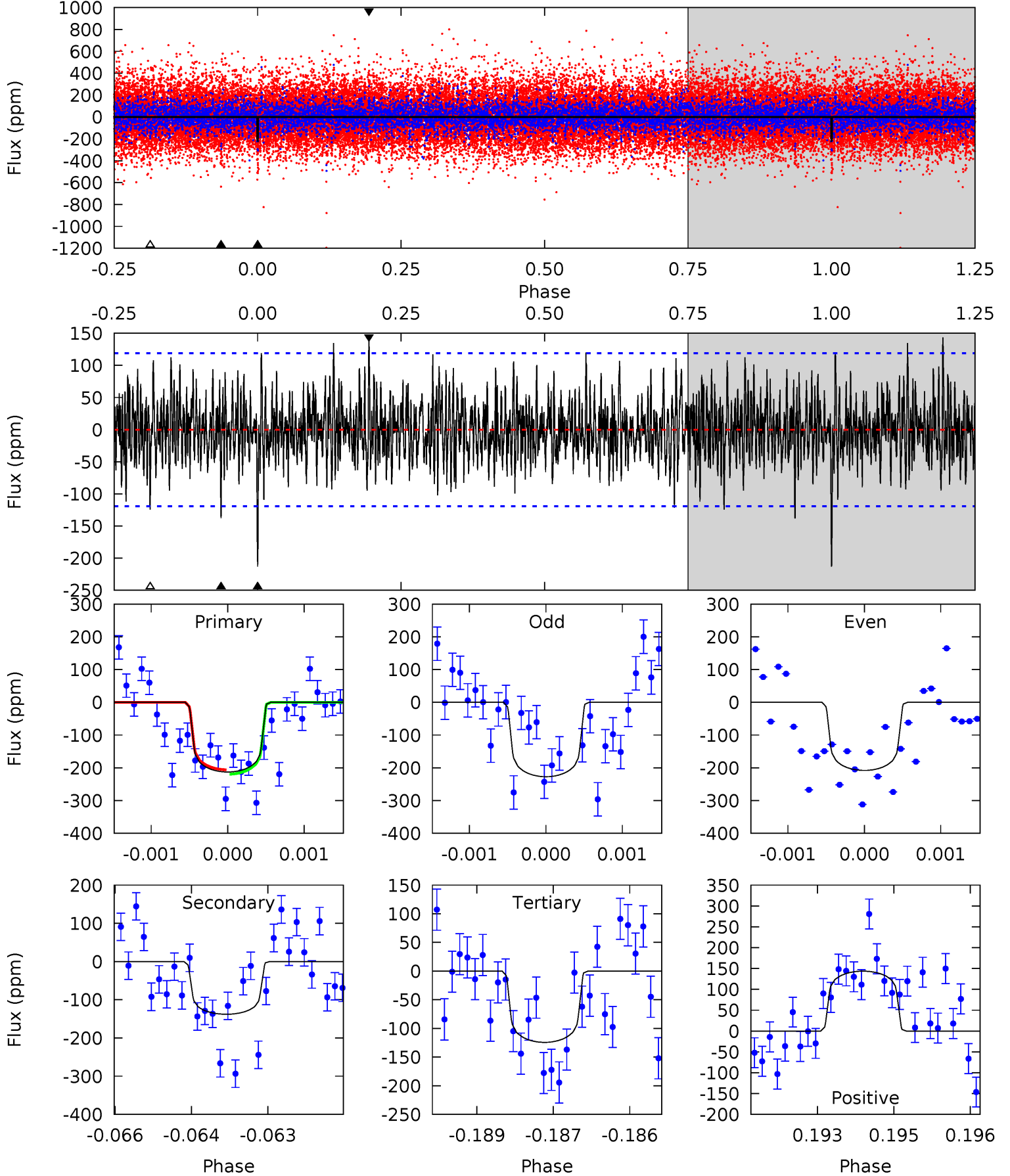
TCE 010862759-03 $P=206.910229$ Days $T_0=183.513492$ (BKJD)



DV Model-Shift Uniqueness Test

010862759-03, P = 206.911847 Days, E = 183.520322 Days

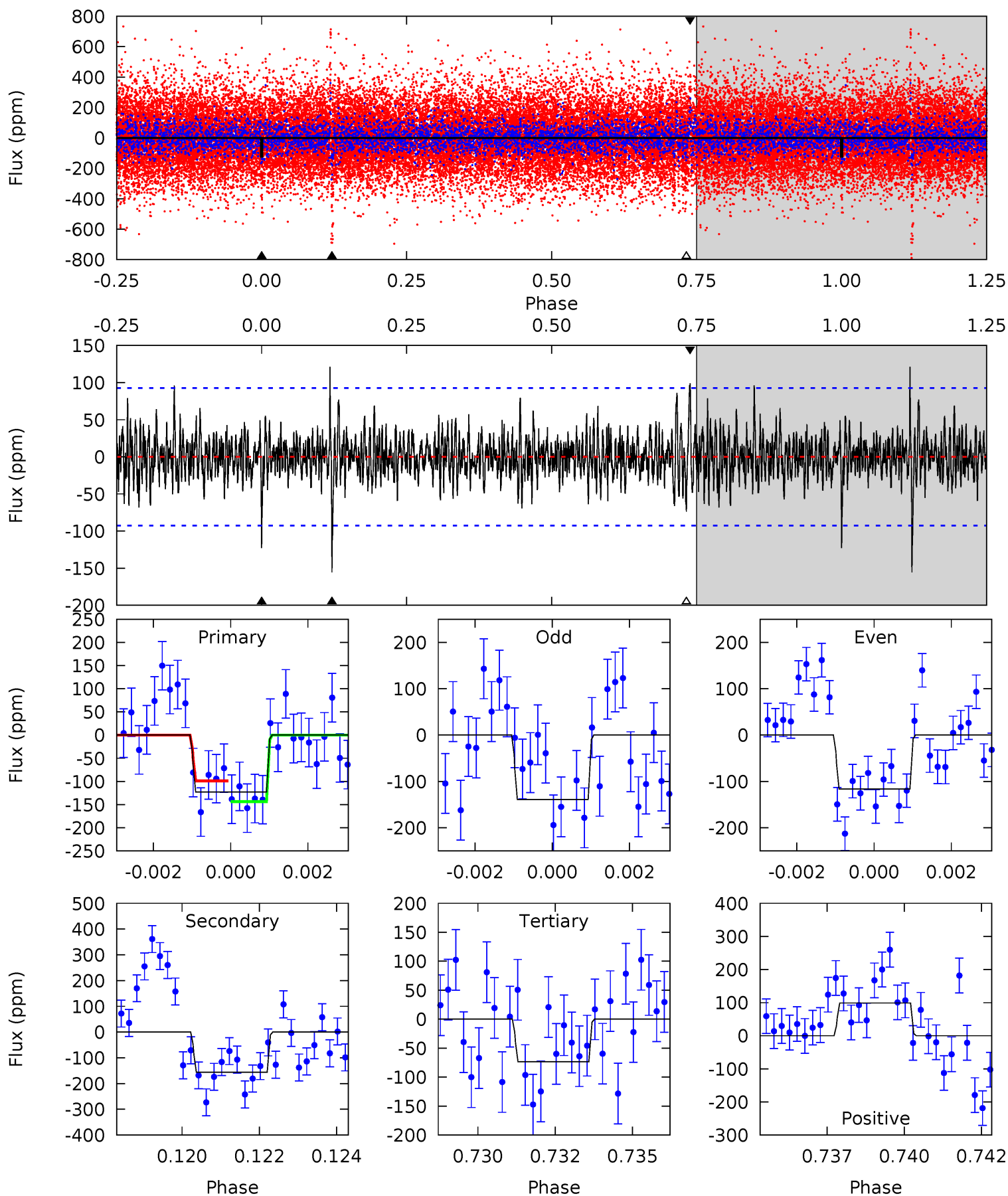
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.62	6.23	5.61	6.48	5.38	3.18	1.76	4.00	3.13	0.61	-0.26	0.39	0.94	0.40	0.31



Alt Model-Shift Uniqueness Test

010862759-03, P = 206.910229 Days, E = 183.513492 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.01	8.90	4.21	5.65	5.29	3.04	1.37	2.80	1.37	4.69	3.25	0.58	0.89	0.44	1.27



Stellar Parameters For KIC 010862759

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6870^{+168}_{-264}	$4.266^{+0.087}_{-0.203}$	$-0.100^{+0.250}_{-0.350}$	$1.407^{+0.487}_{-0.209}$	$1.337^{+0.201}_{-0.201}$	$0.677^{+0.279}_{-0.378}$
	+2%/-4%	+2%/-5%	+250%/-350%	+35%/-15%	+15%/-15%	+41%/-56%
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 010862759-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-138 ± 22	$2.32^{+0.81}_{-0.69}$	585^{+46}_{-35}	6075^{+1177}_{-741}	7968^{+7967}_{-3763}
Alt.	-156 ± 17	$1.74^{+0.72}_{-0.69}$	582^{+45}_{-32}	7354^{+2878}_{-1264}	15929^{+26709}_{-7991}

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

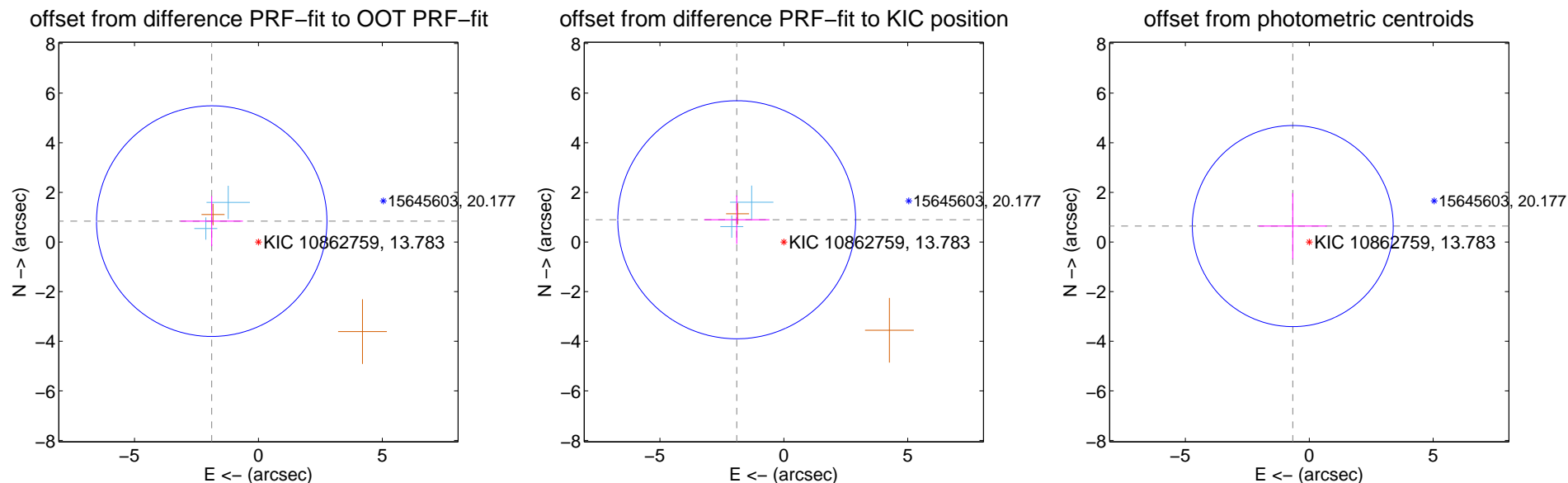
DV Centroid Data

Supplemental centroid analysis for 010862759-03. Kepler magnitude: 13.78. Transit SNR 6.10

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.063 ± 1.549	1.33	1.884 ± 1.258	0.841 ± 1.006
PRF-fit source offset from KIC position	2.102 ± 1.599	1.31	1.901 ± 1.319	0.897 ± 0.974
photometric centroid source offset	0.92 ± 1.35	0.68	0.66 ± 1.37	0.64 ± 1.33



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 ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

Q1 no difference image



Q1 no OOT image



Q2 no difference image



Q2 no OOT image



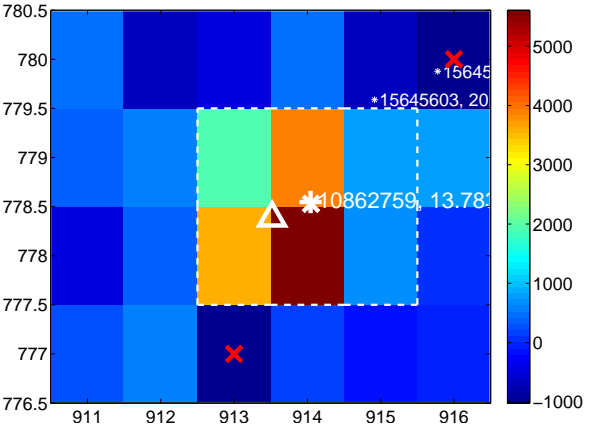
Q3 no difference image



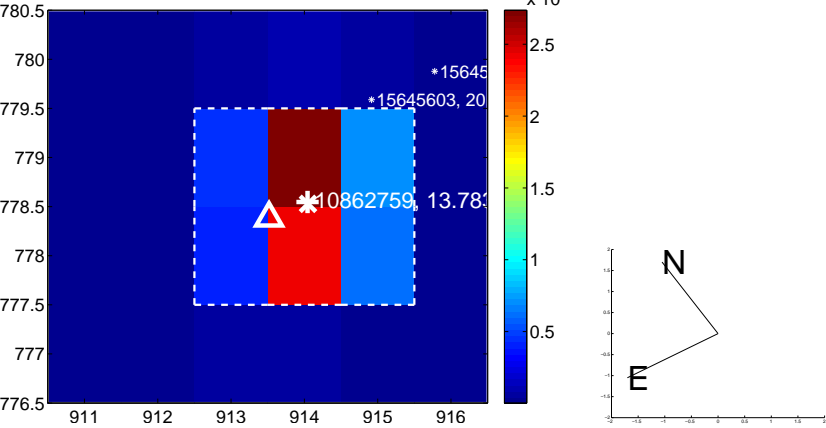
Q3 no OOT image



Q4 difference image



Q4 OOT image



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

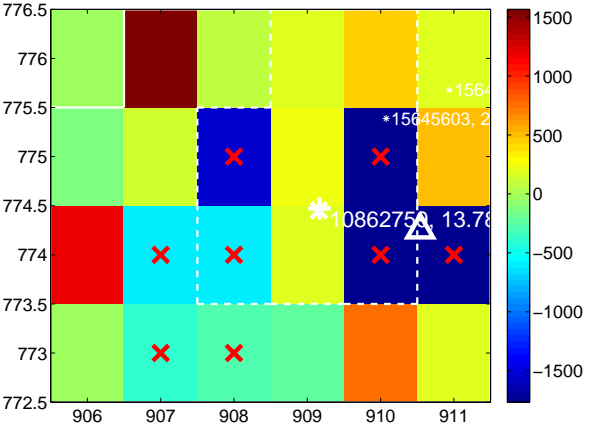
Q5 no difference image



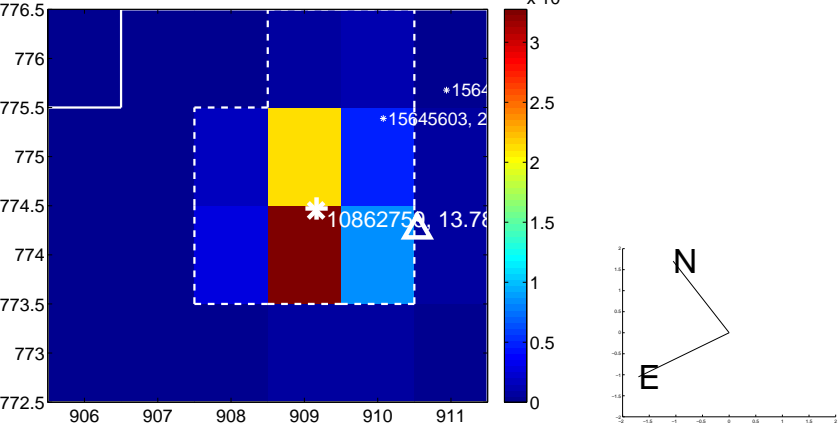
Q5 no OOT image



Q6 difference image. Poor Quality



Q6 OOT image



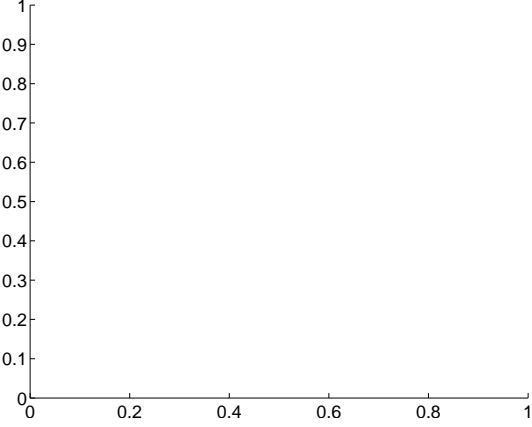
Q7 no difference image



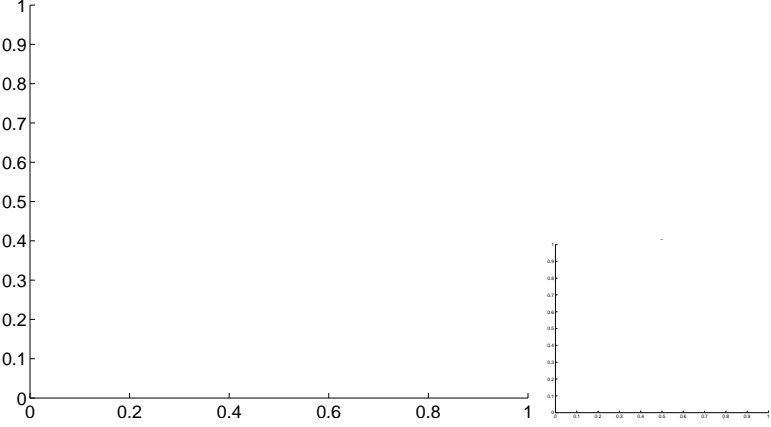
Q7 no OOT image



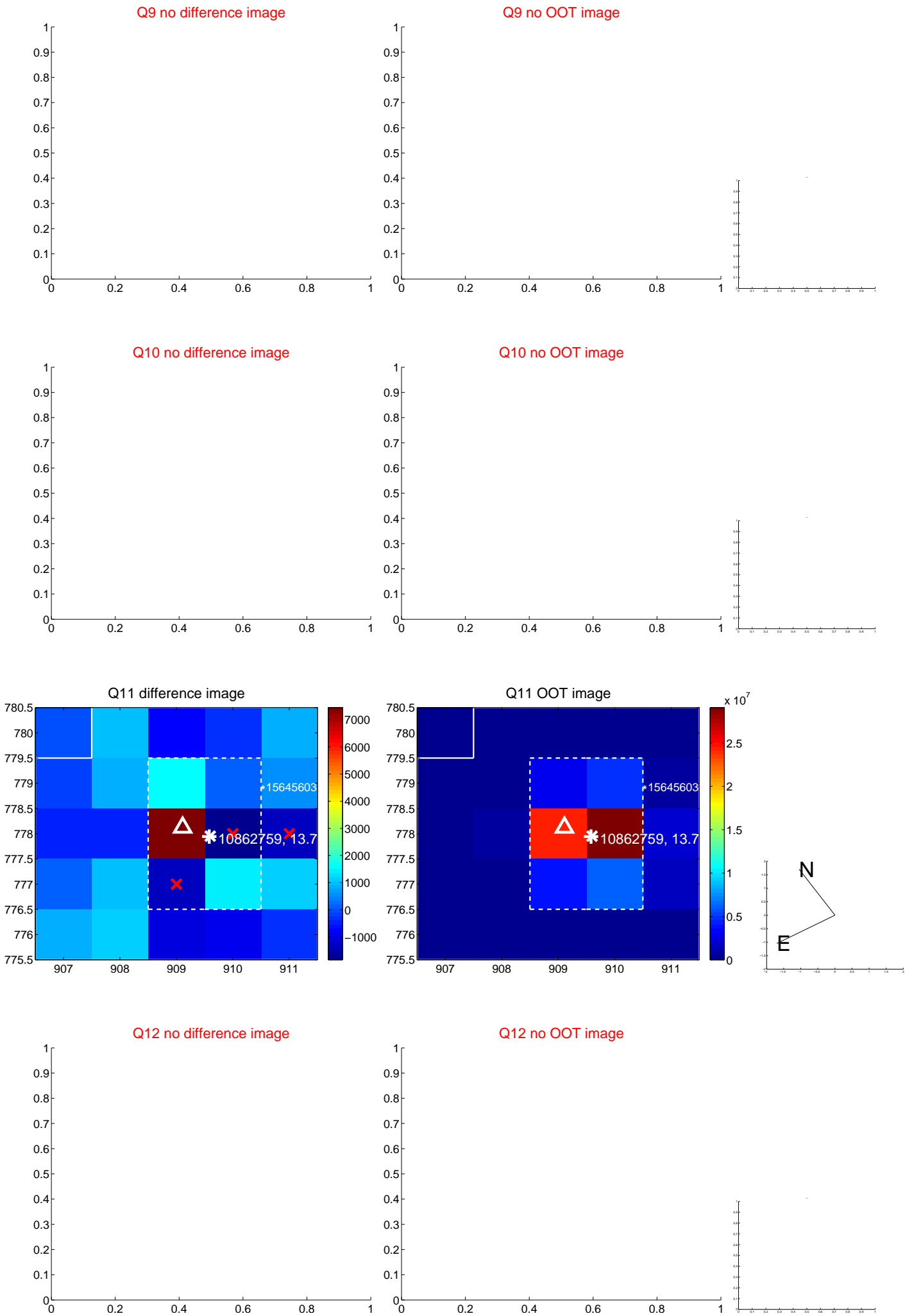
Q8 no difference image



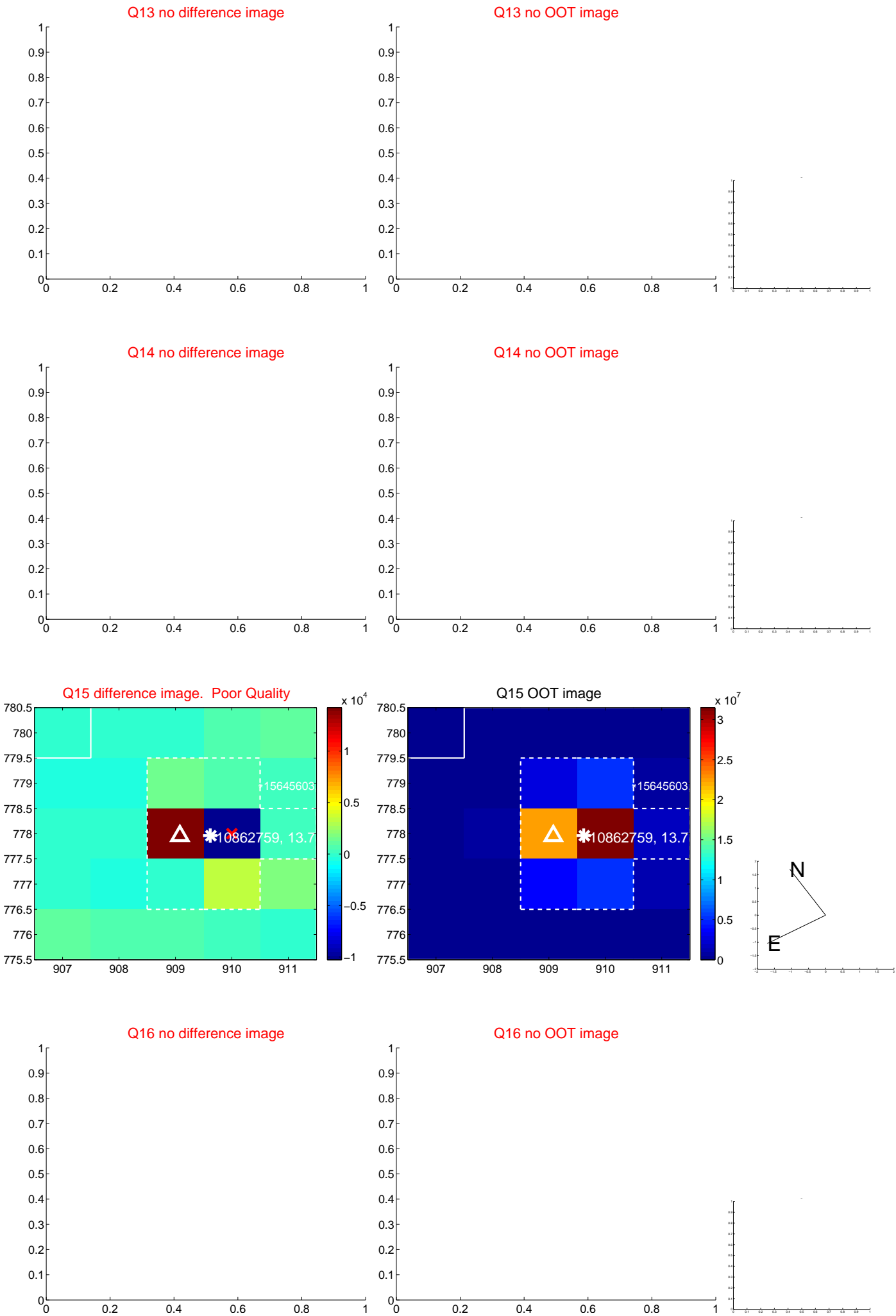
Q8 no OOT image



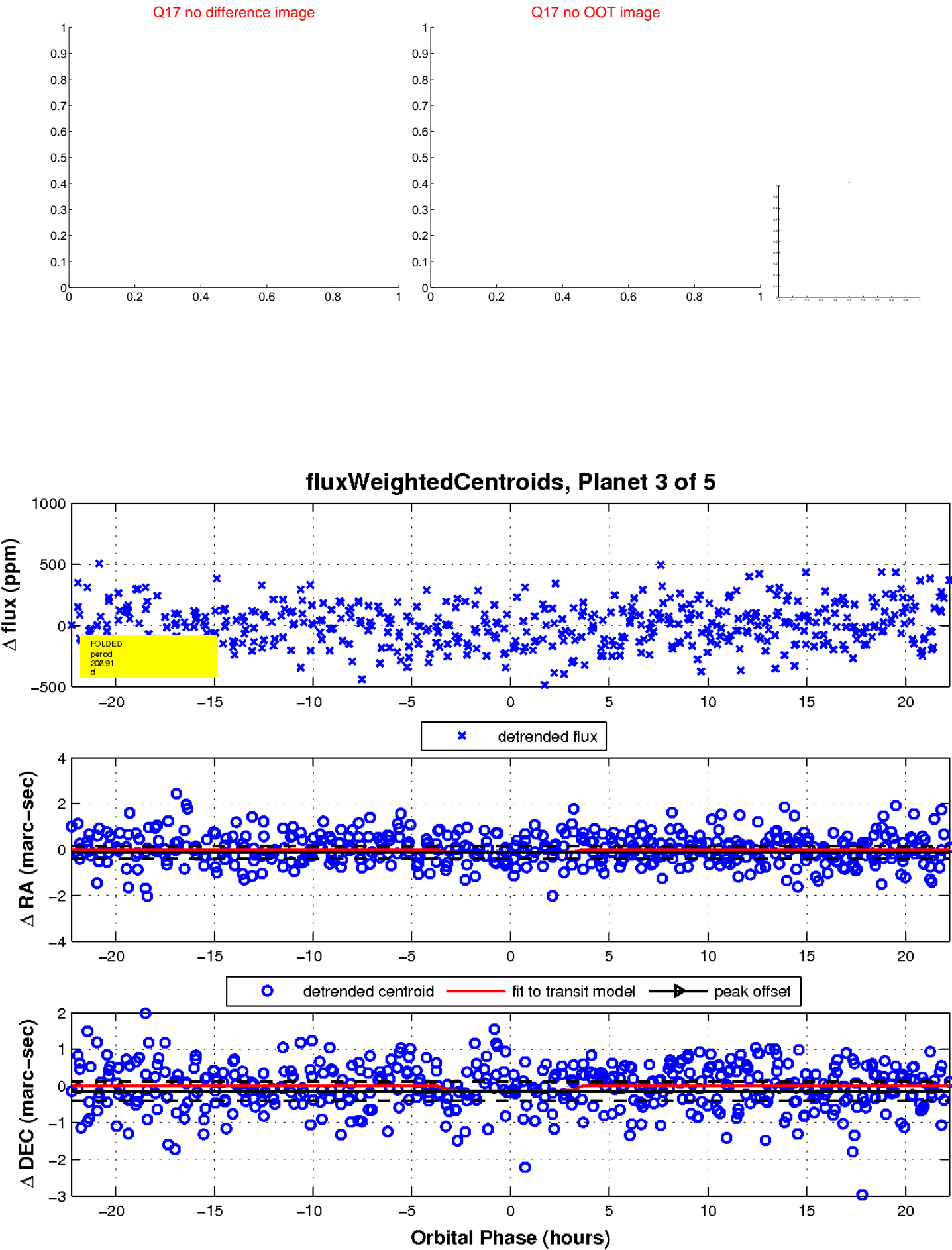
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



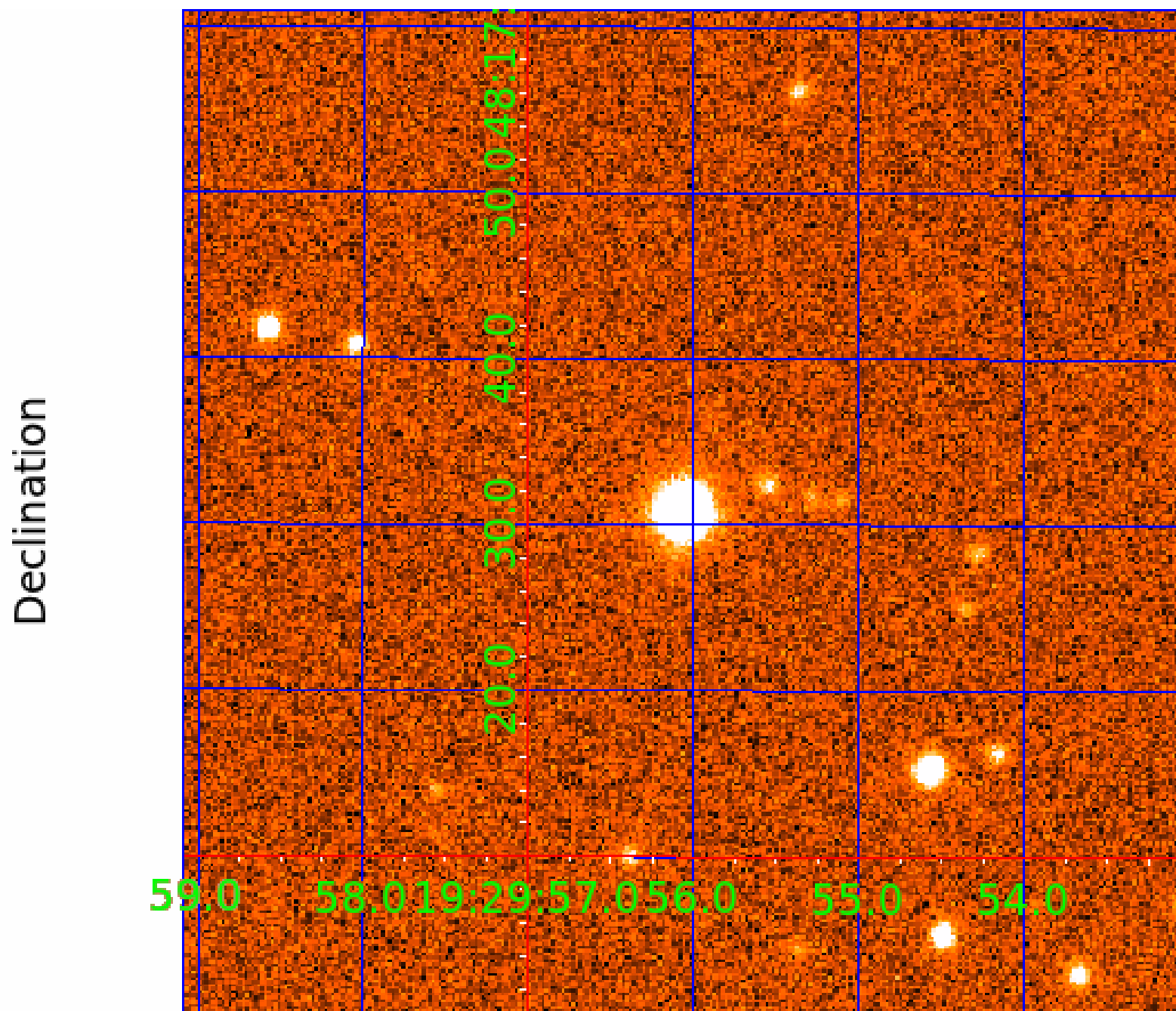
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 010862759

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})
010862759-01	OBS	8035.01	29.485669	151.865142	111.2	4.394	8.3	8.5	1.41	6870	1.70	93.49
010862759-02	OBS	No	4.637444	132.384216	21.9	17.312	7.7	5.9	1.41	6870	0.82	1101.23
010862759-03	OBS	No	206.911847	183.520322	201.3	7.412	10.7	6.1	1.41	6870	2.28	6.96
010862759-04	OBS	No	4.637125	134.770067	36.5	13.145	9.5	10.2	1.41	6870	0.96	1101.33
010862759-05	OBS	No	192.379959	208.232568	149.2	11.834	9.8	4.9	1.41	6870	1.75	7.67

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010862759-01	OBS	PC	0.85	0	0	0	0	NO_COMMENT
010862759-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
010862759-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010862759-04	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD
010862759-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST

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

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

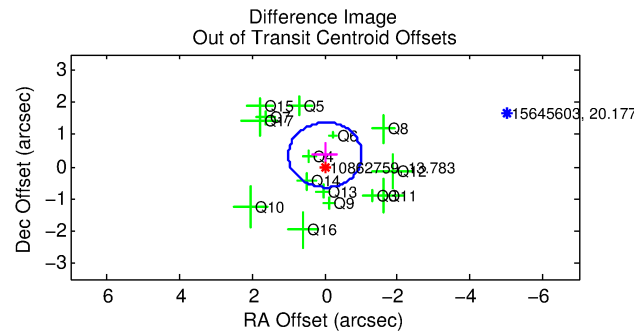
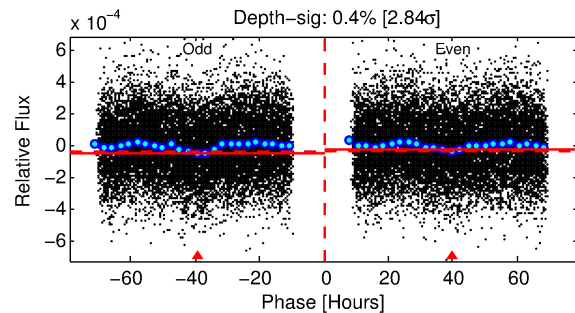
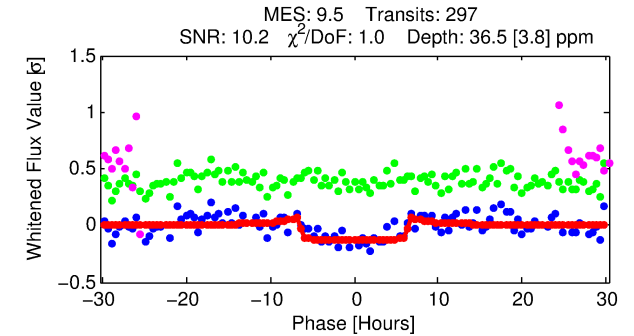
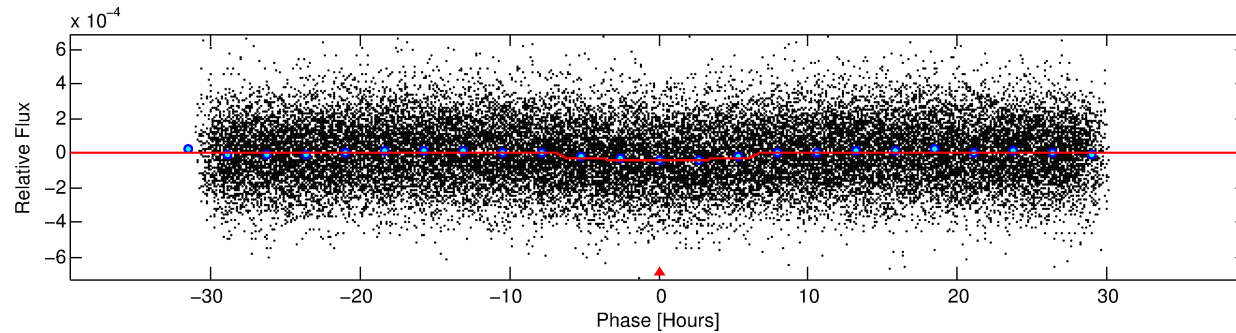
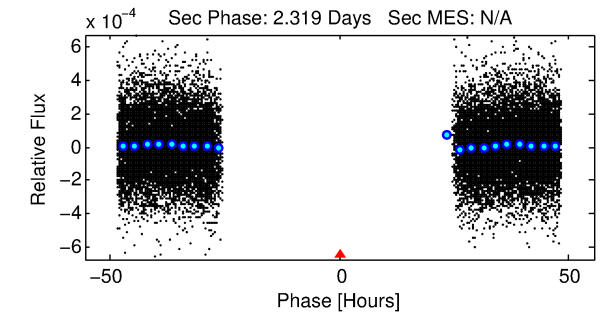
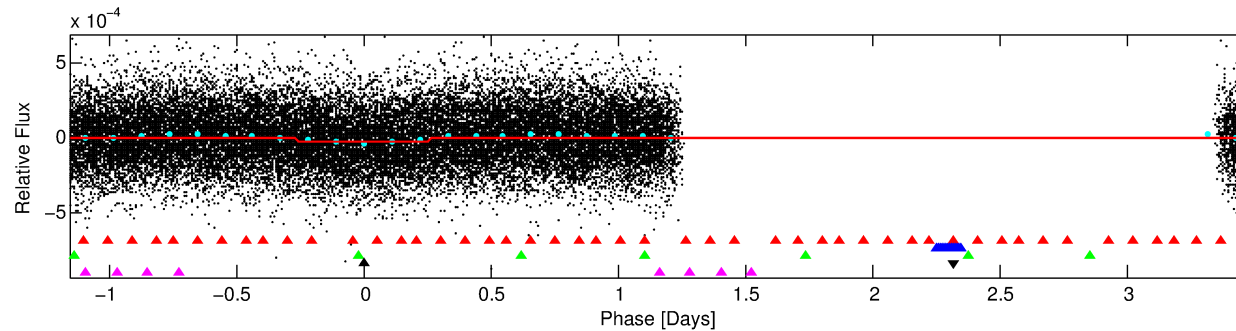
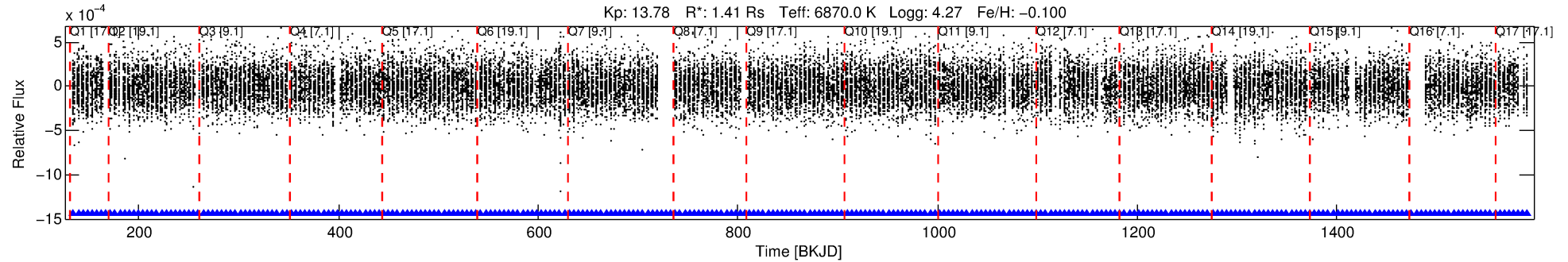
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010862759-04

No Significant Match Found

DV One-Page Summary

KIC: 10862759 Candidate: 4 of 5 Period: 4.637 d



DV Fit Results:

Period = 4.63712 [0.00006] d
Epoch = 134.7701 [0.0090] BKJD
Rp/R* = 0.0063 [0.0011]
a/R* = 1.70 [1.08]
b = 0.85 [0.31]
Seff = 1101.33 [459.37]
Teq = 1469 [153] K
Rp = 0.96 [0.37] Re
a = 0.0599 [0.0167] AU

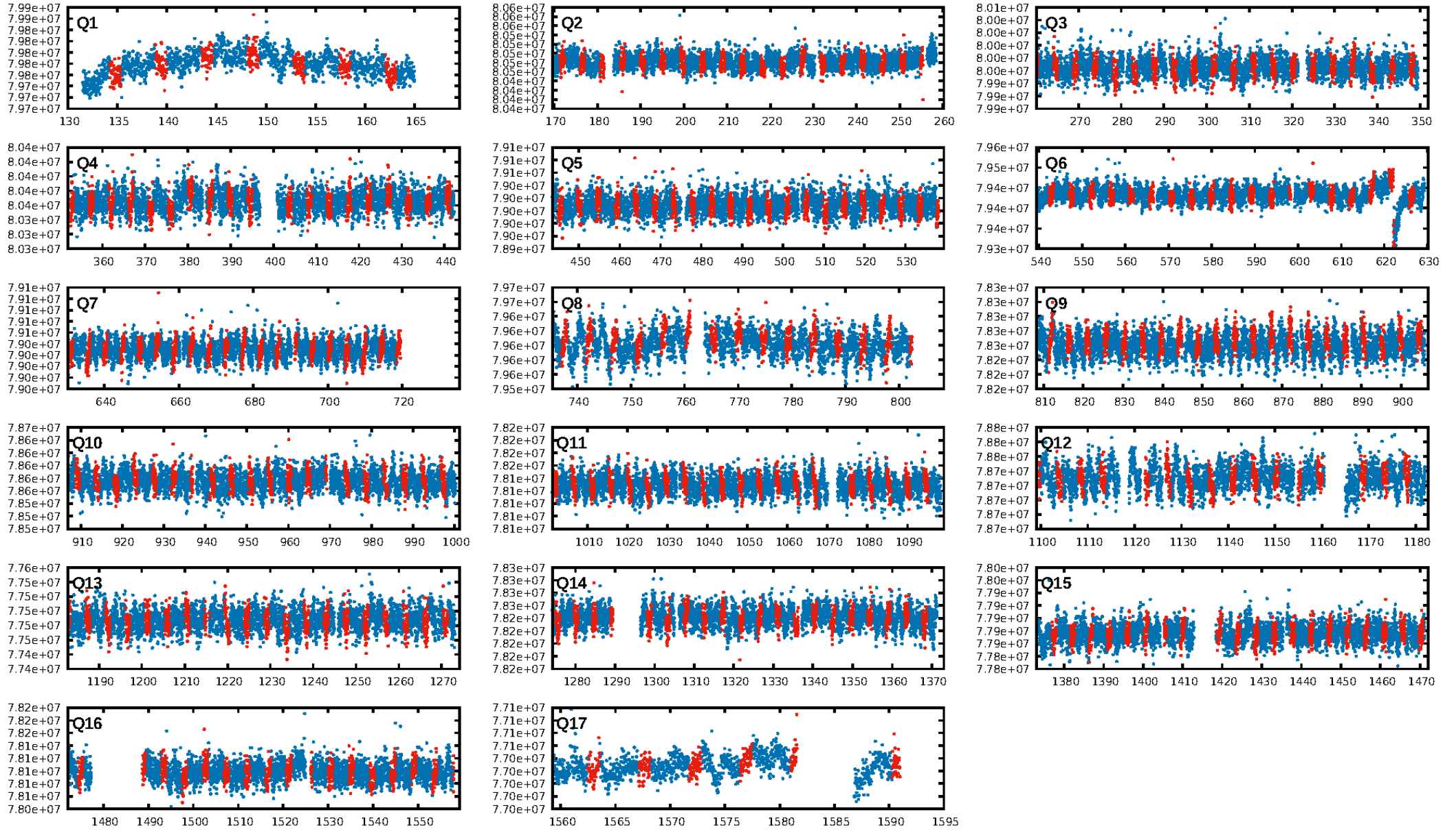
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.65e-17
RollingBand-fgt: 1.00 [284/284]
GhostDiagnostic-chr: 6.954
Centroid-sig: 65.6%
Centroid-so: 0.380 arcsec [0.52 σ]
OotOffset-rm: 0.363 arcsec [1.08 σ]
KicOffset-rm: 0.400 arcsec [1.29 σ]
OotOffset-st: 3/4/4/4 [15]
KicOffset-st: 3/4/4/4 [15]
DiffImageQuality-fgm: 0.73 [11/15]
DiffImageOverlap-fno: 1.00 [17/17]

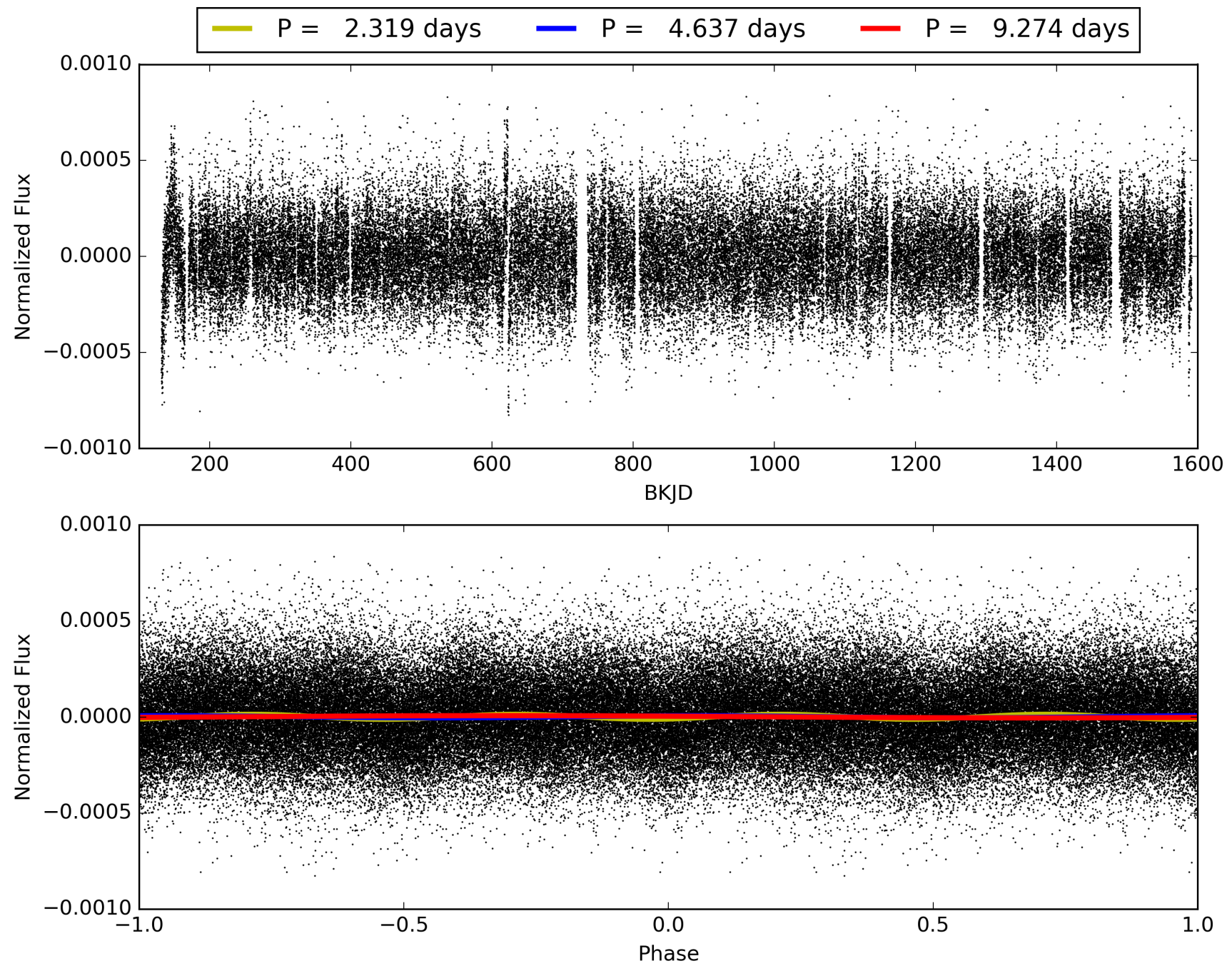
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 09:26:10 Z

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

TCE 010862759-04, PDC Light Curves

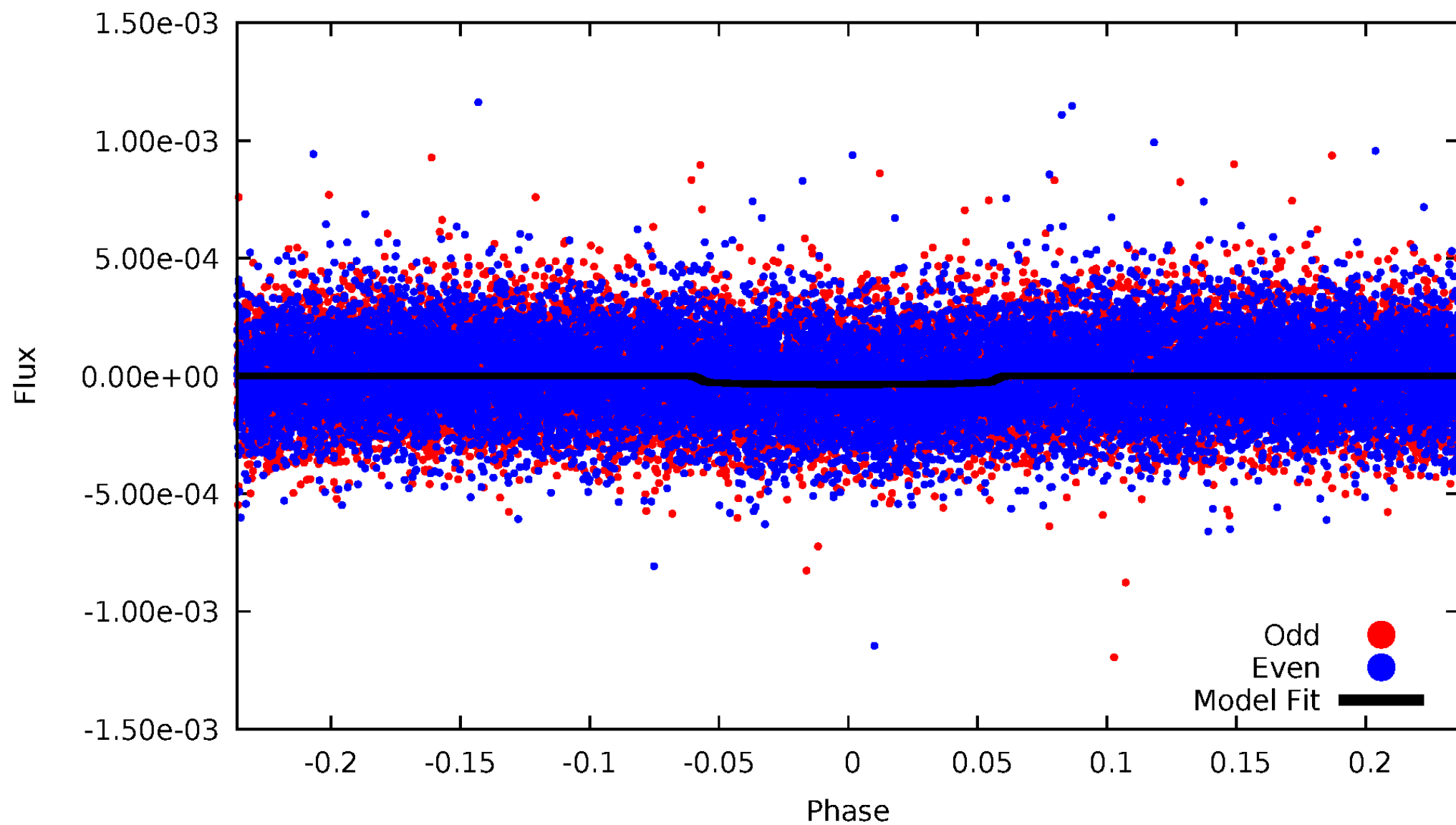


TCE 010862759-04



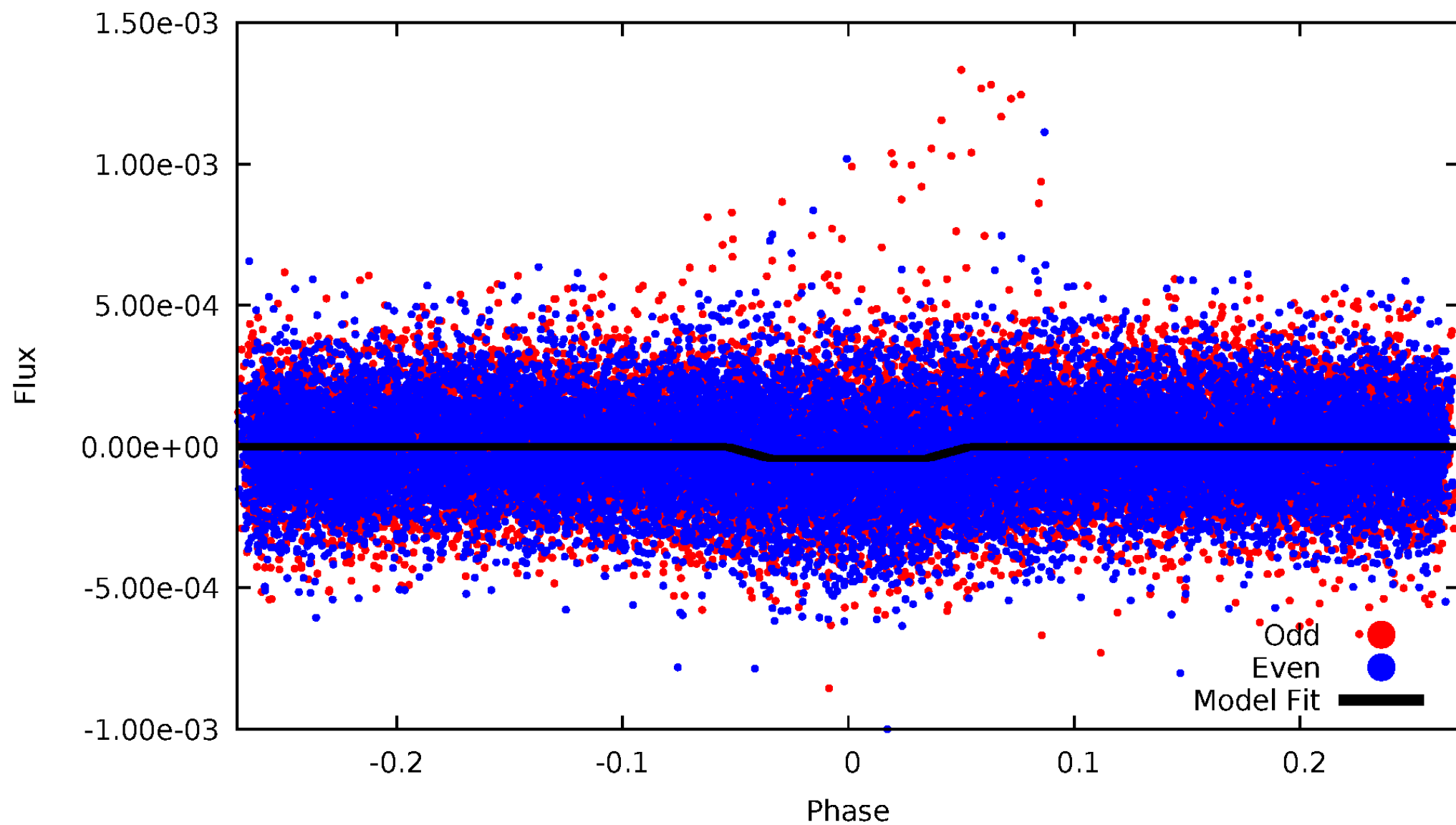
DV Odd/Even

TCE 010862759-04



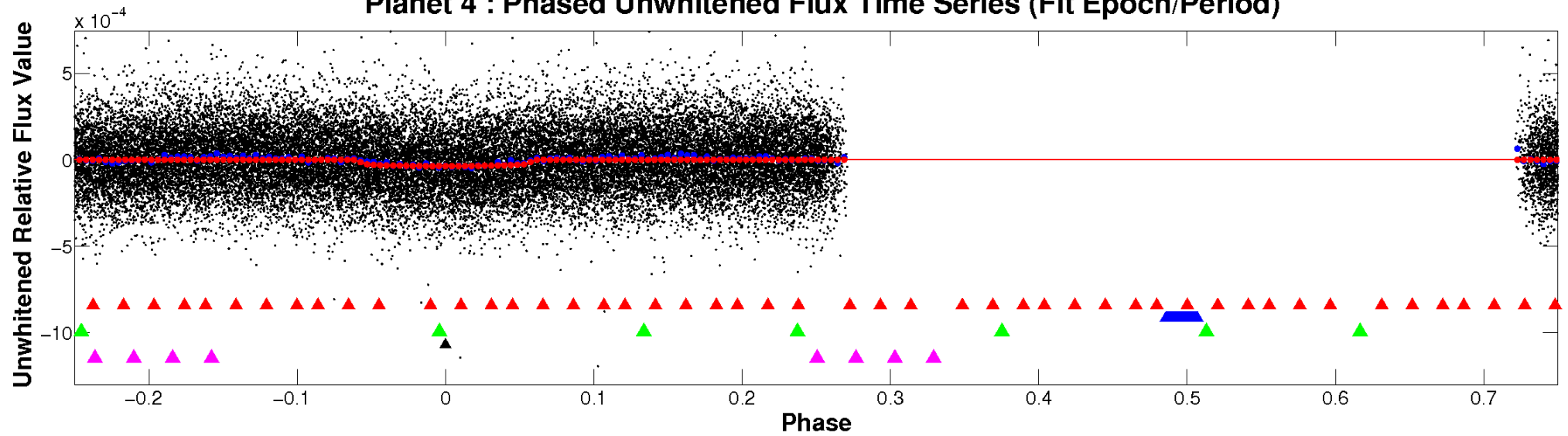
ALT Odd/Even

TCE 010862759-04

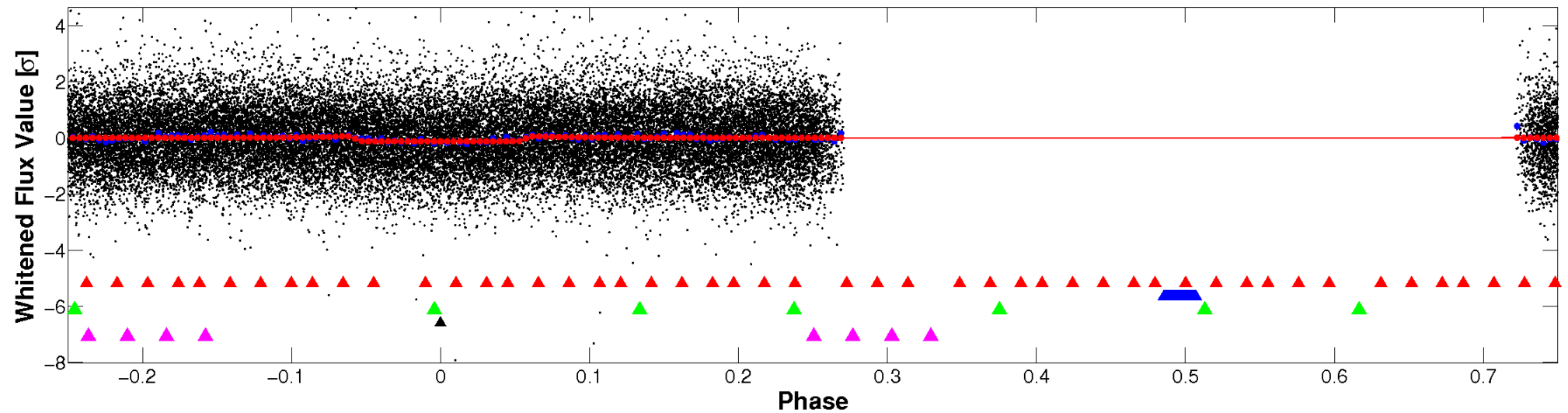


Non-Whitened Vs. Whitened Light Curve

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

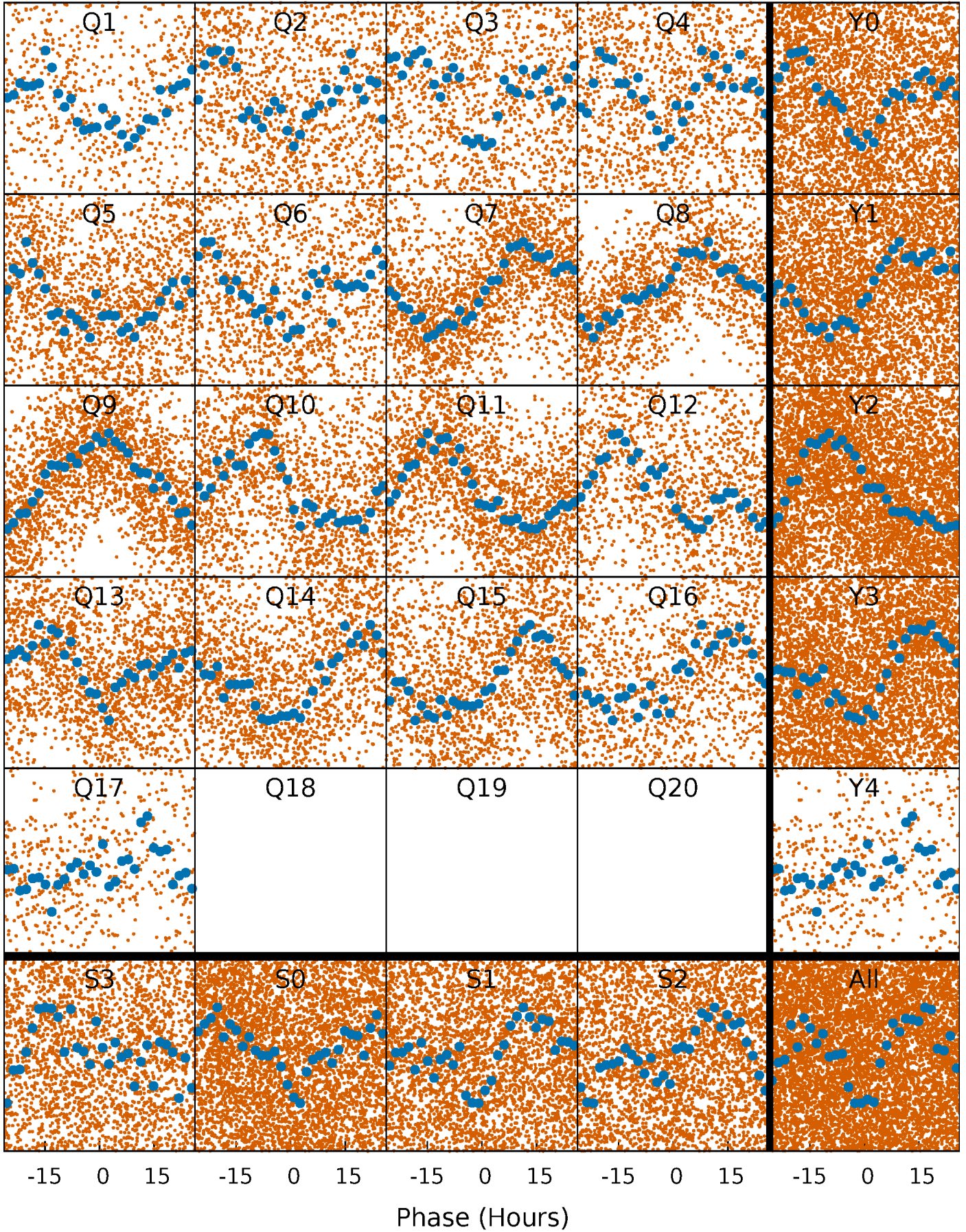


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



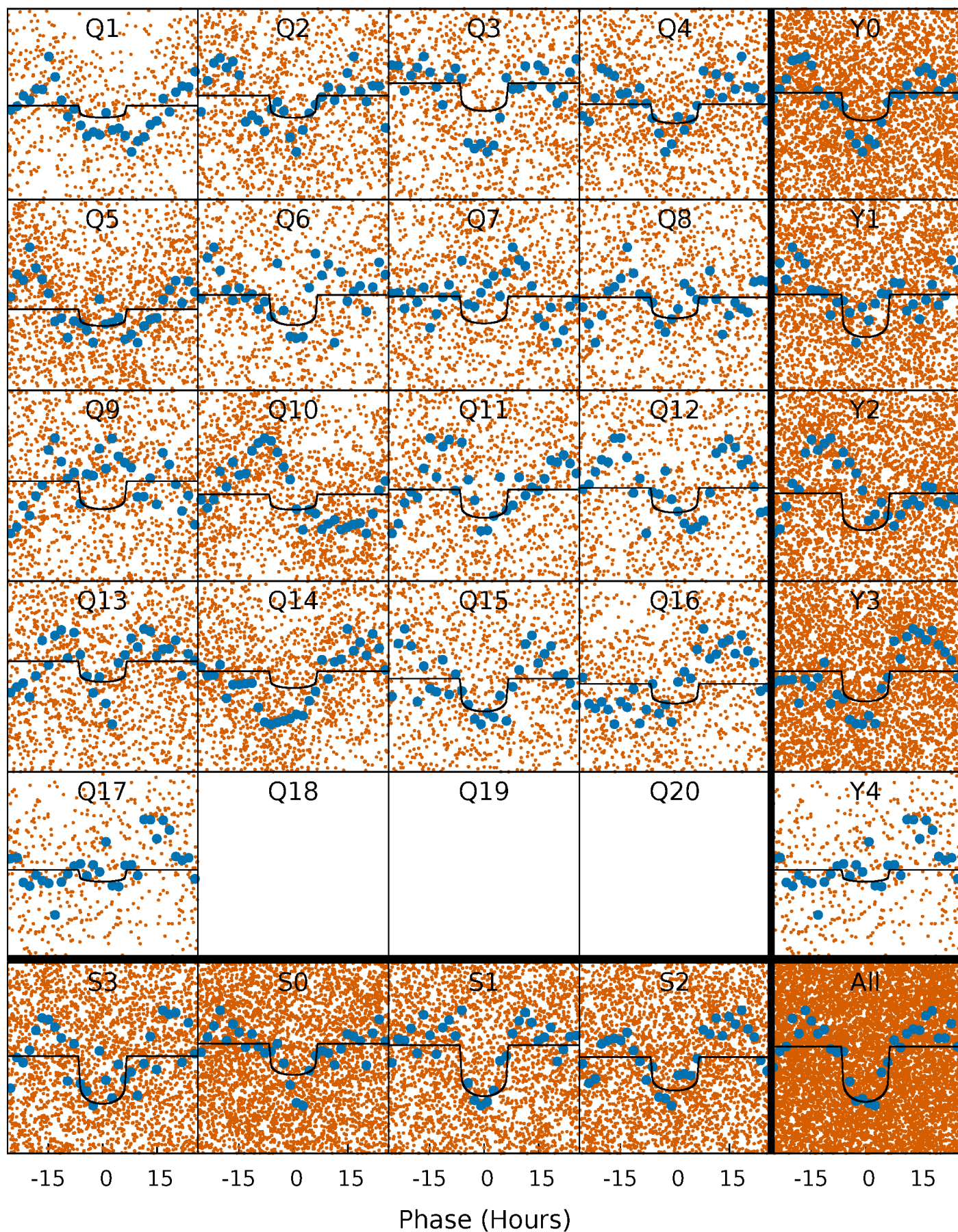
PDC Quarter-Phased Transit Curves

TCE 010862759-04 P= 4.637125 Days $T_0=134.770067$ (BKJD)



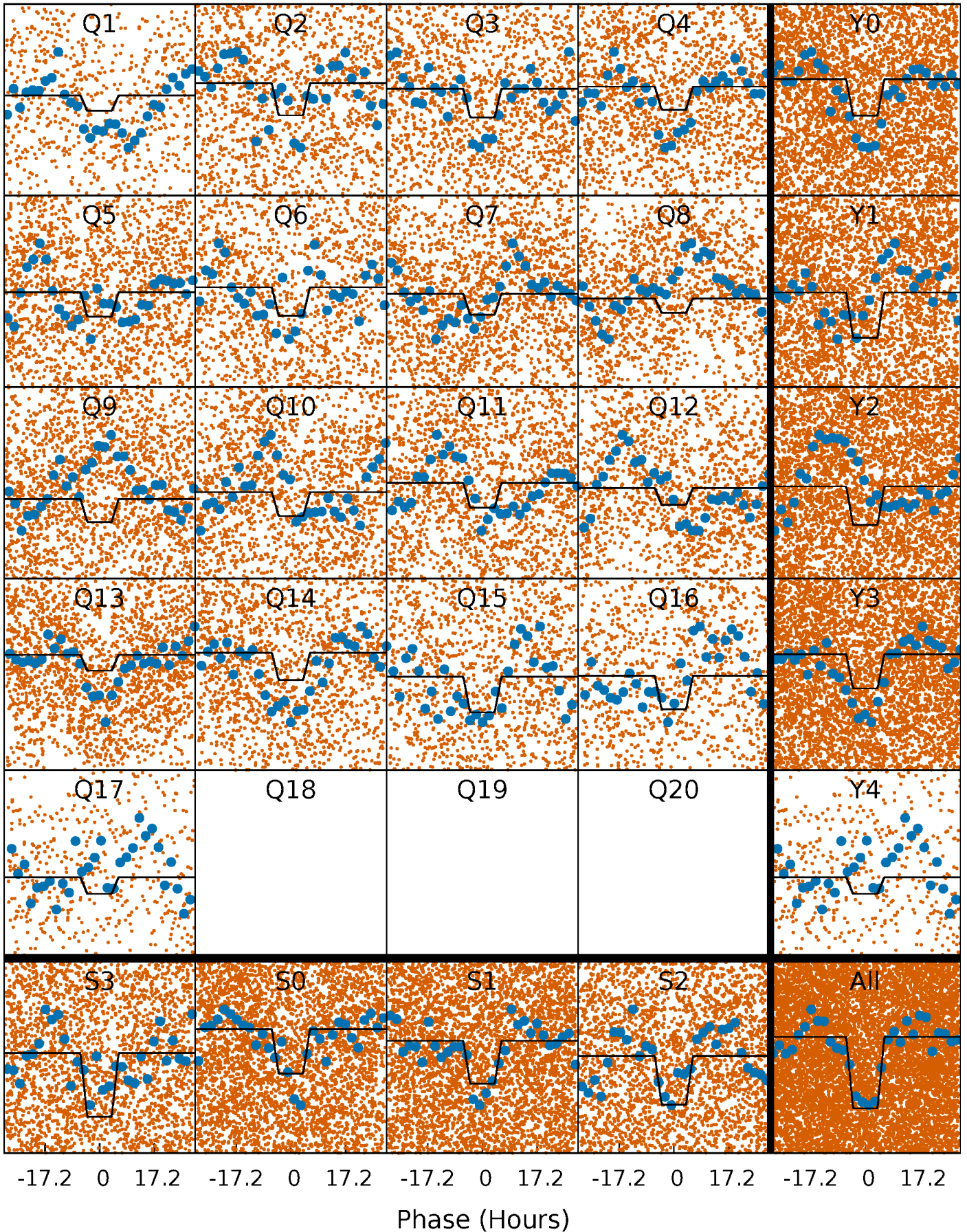
DV Quarter-Phased Transit Curves

TCE 010862759-04 P= 4.637125 Days $T_0=134.770067$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

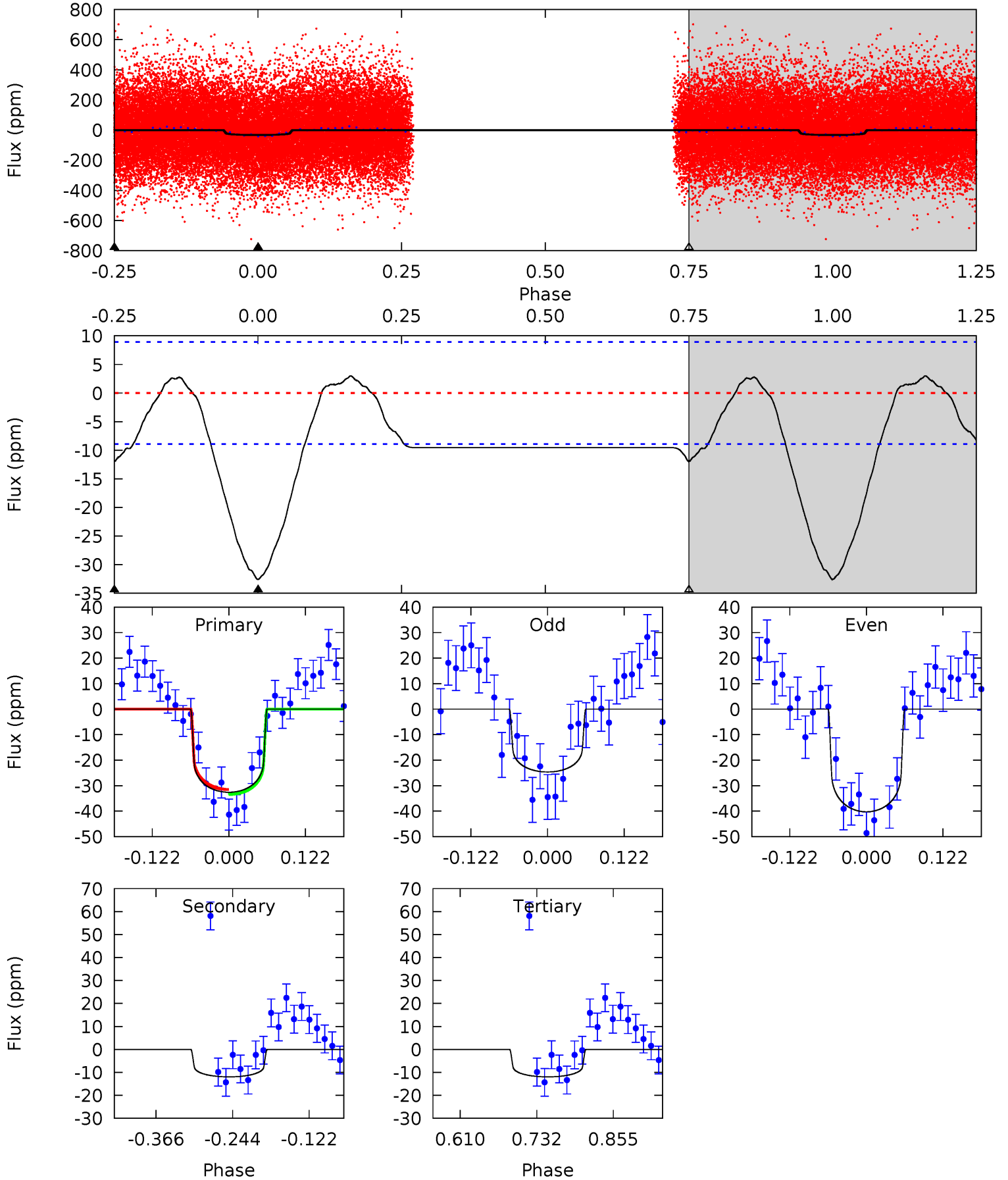
TCE 010862759-04 P= 4.637277 Days $T_0=134.733088$ (BKJD)



DV Model-Shift Uniqueness Test

010862759-04, P = 4.637125 Days, E = 130.132942 Days

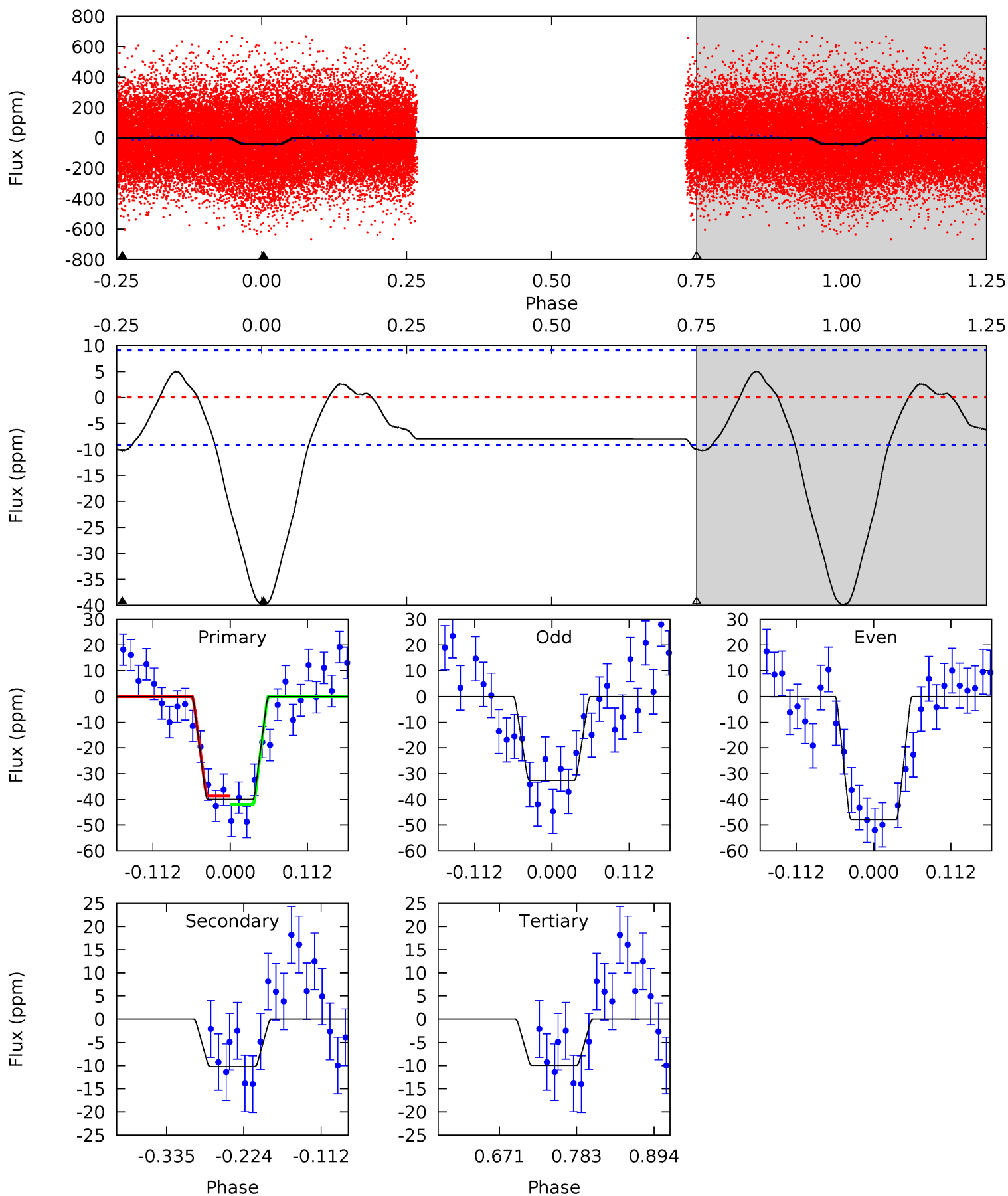
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.5	6.05	6.05	0	4.52	1.55	2.43	10.4	16.5	0.00	6.05	3.95	1.10	0.08	0.48



Alt Model-Shift Uniqueness Test

010862759-04, P = 4.637277 Days, E = 130.095811 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.0	5.11	4.98	0	4.54	1.59	1.94	15.0	20.0	0.12	5.11	3.84	1.02	0.11	0.81



Stellar Parameters For KIC 010862759

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6870^{+168}_{-264}	$4.266^{+0.087}_{-0.203}$	$-0.100^{+0.250}_{-0.350}$	$1.407^{+0.487}_{-0.209}$	$1.337^{+0.201}_{-0.201}$	$0.677^{+0.279}_{-0.378}$
	+2%/-4%	+2%/-5%	+250%/-350%	+35%/-15%	+15%/-15%	+41%/-56%
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 010862759-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-12 ± 2	$0.99^{+0.21}_{-0.20}$	2070^{+167}_{-120}	5116^{+456}_{-400}	24^{+14}_{-9}
Alt.	-10 ± 2	$1.04^{+0.25}_{-0.21}$	2069^{+164}_{-114}	4831^{+451}_{-359}	18^{+10}_{-7}

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 $A_{obs} \gg 1.0$

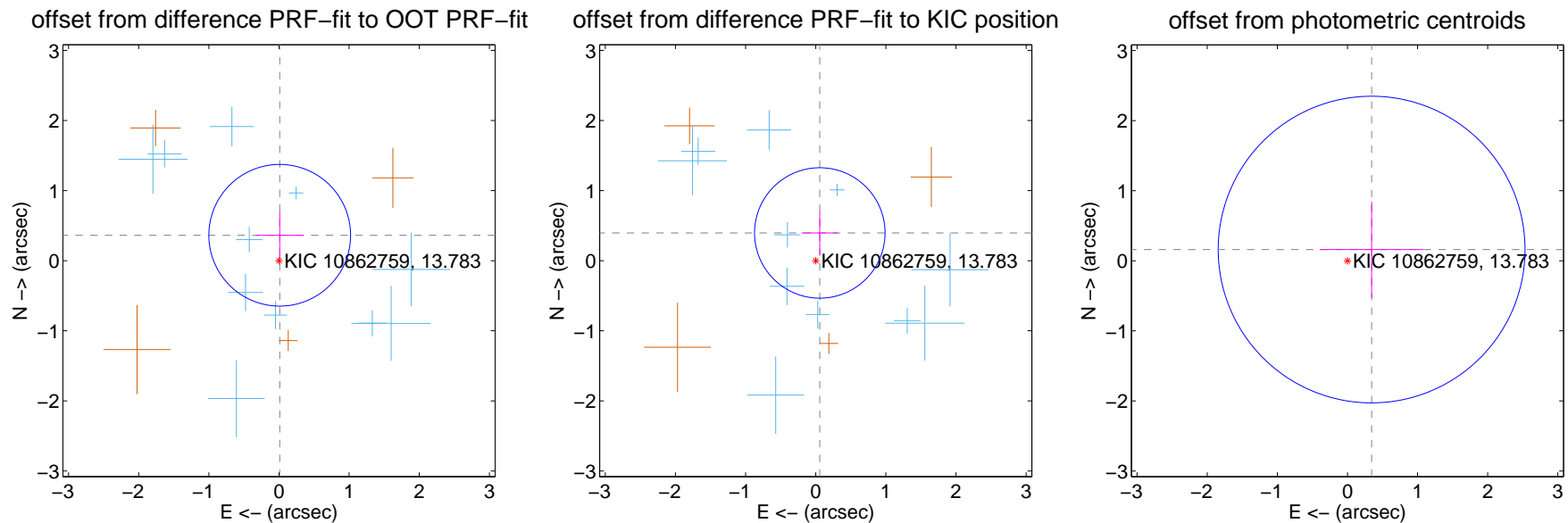
DV Centroid Data

Supplemental centroid analysis for 010862759-04. Kepler magnitude: 13.78. Transit SNR 10.21

There are 11 quarters with good PRF difference image offsets

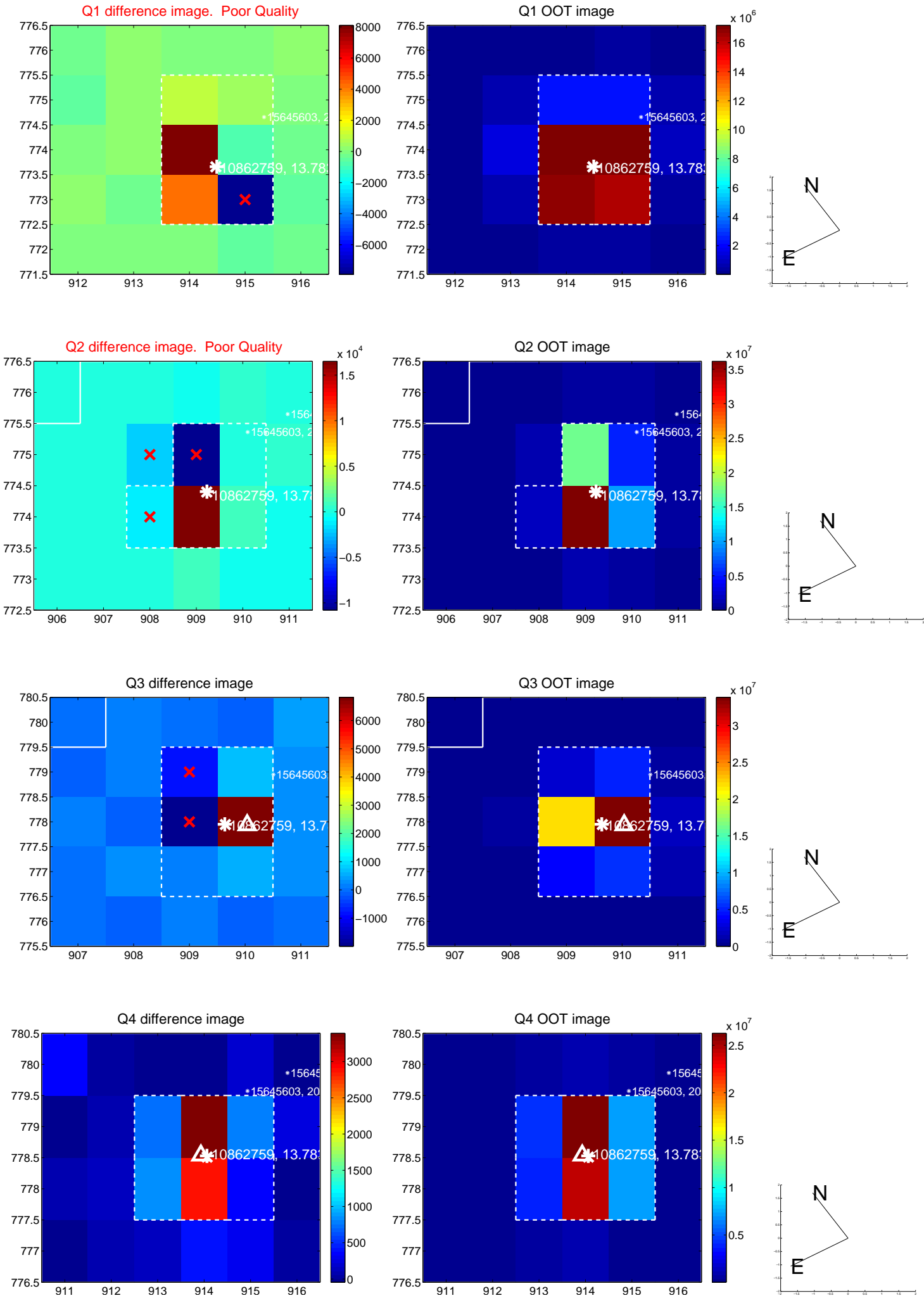
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.363 ± 0.337	1.08	-0.010 ± 0.342	0.363 ± 0.339
PRF-fit source offset from KIC position	0.400 ± 0.310	1.29	-0.058 ± 0.257	0.396 ± 0.311
photometric centroid source offset	0.38 ± 0.73	0.52	-0.34 ± 0.74	0.16 ± 0.69

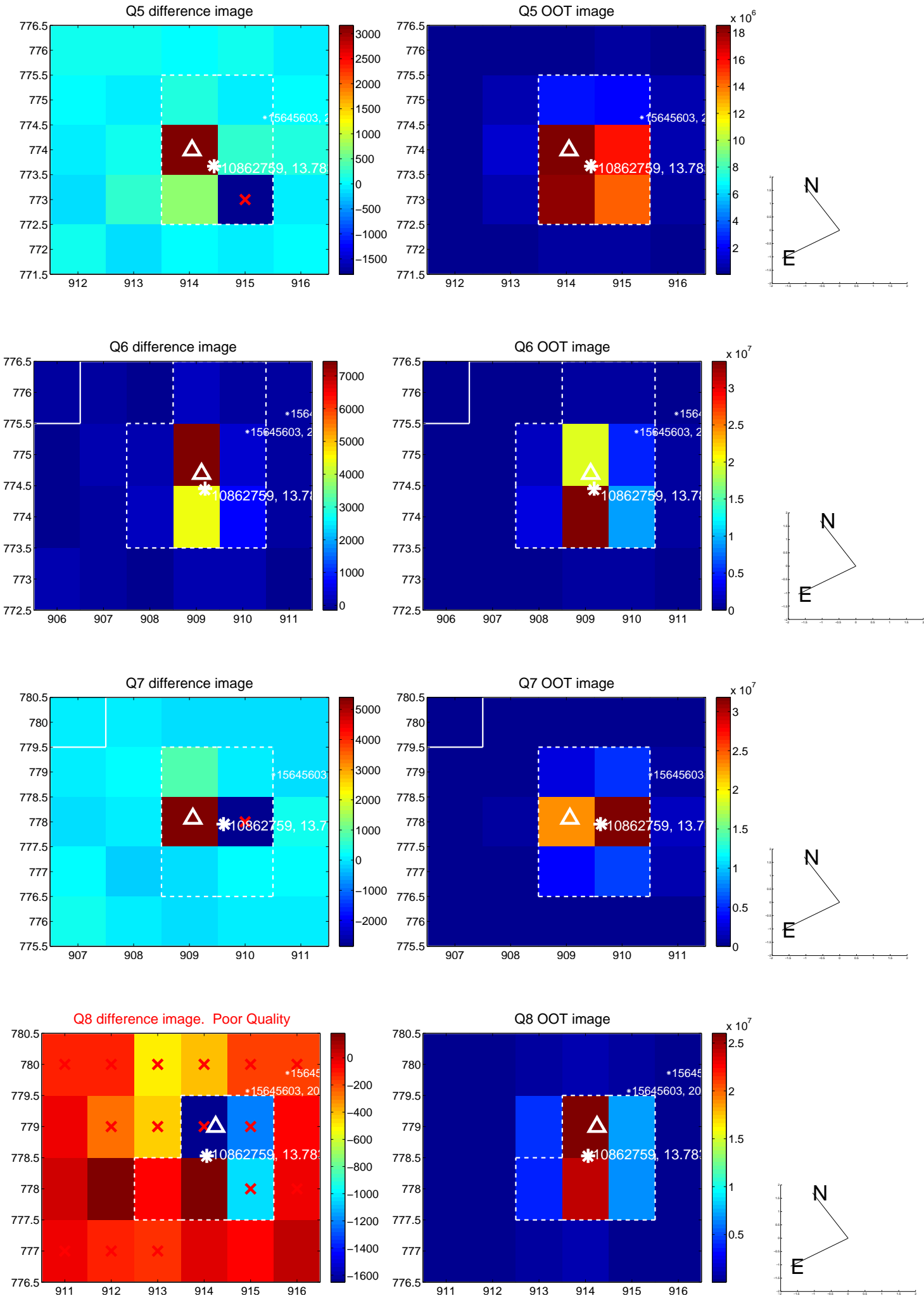


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

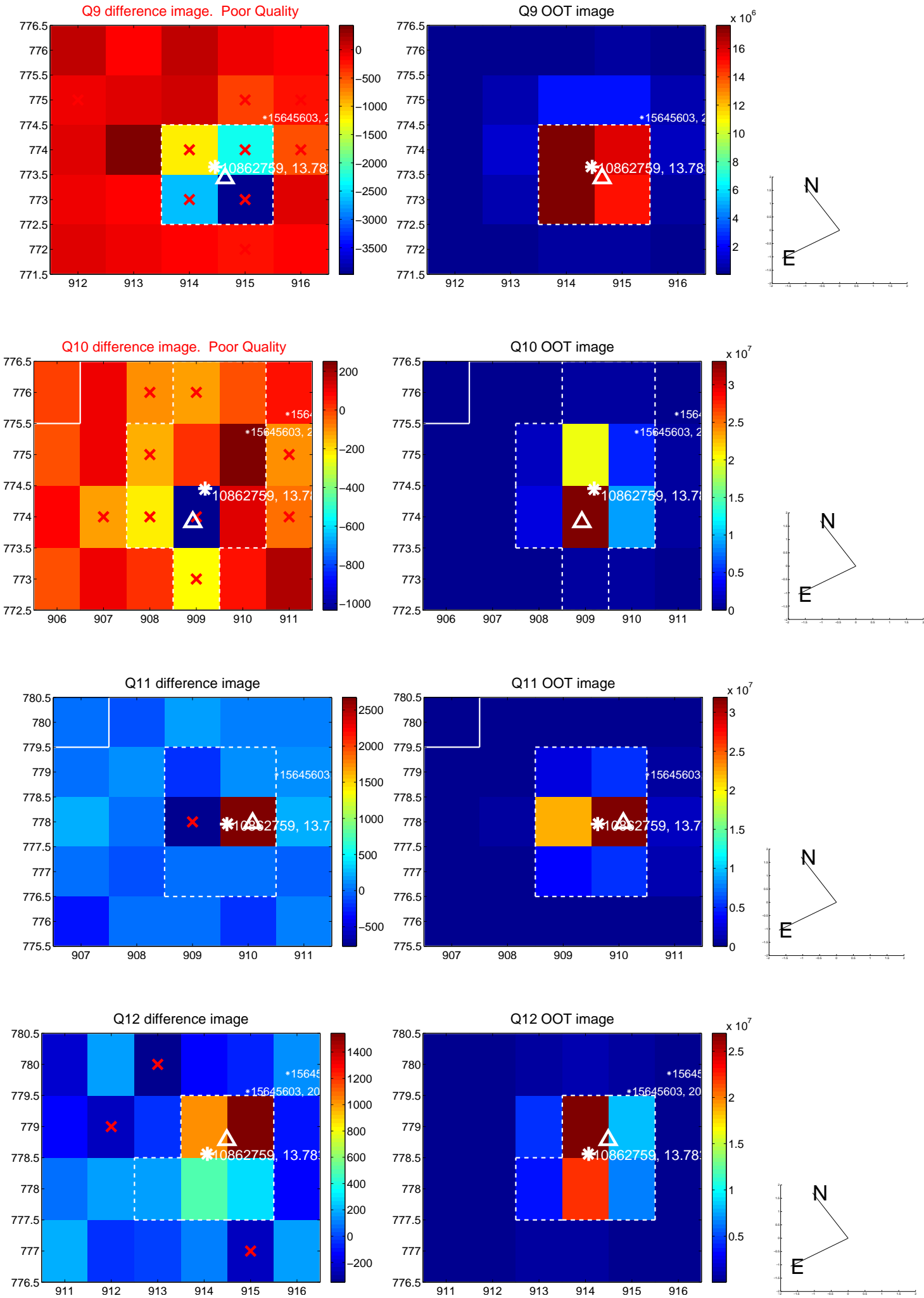
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



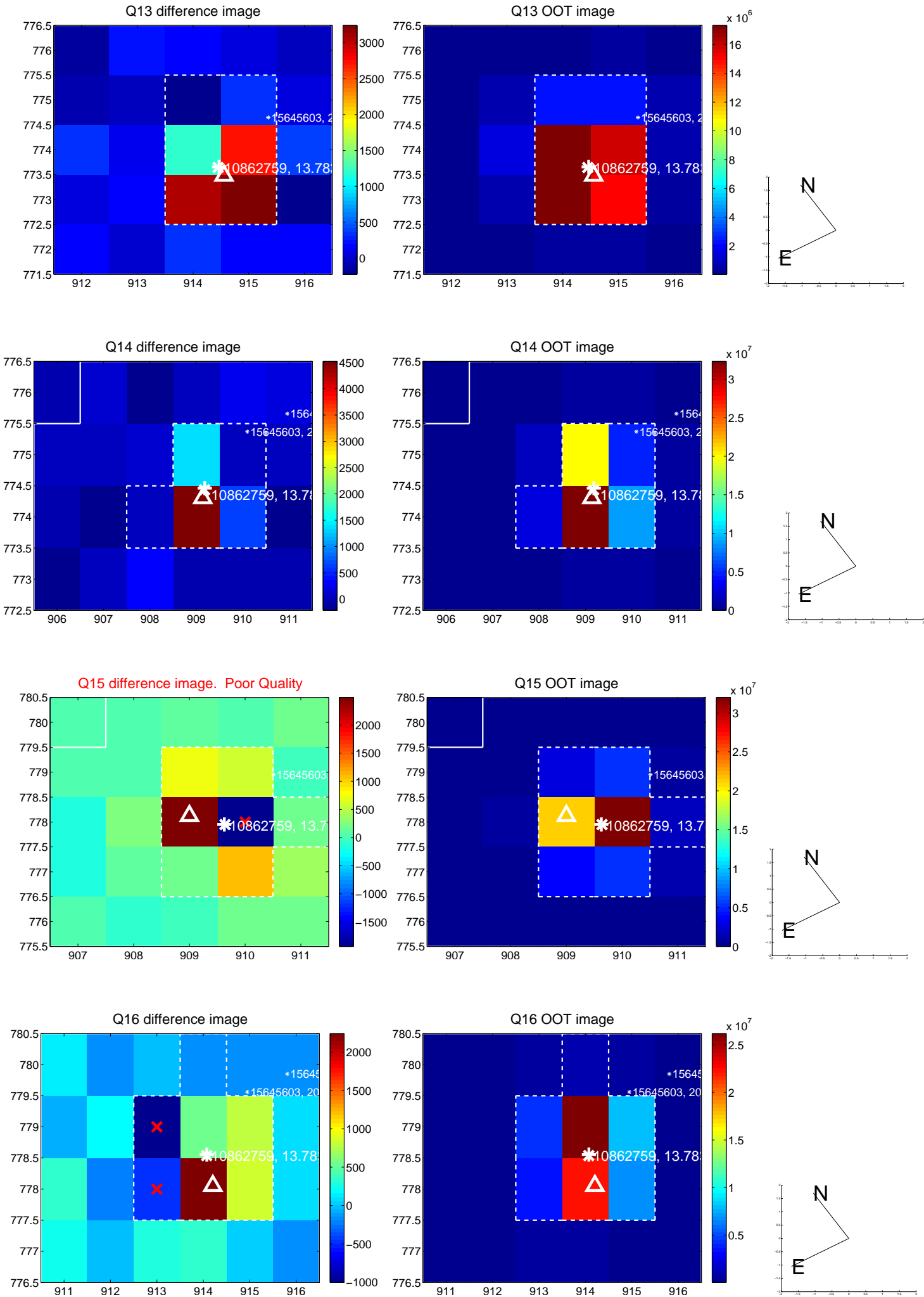
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



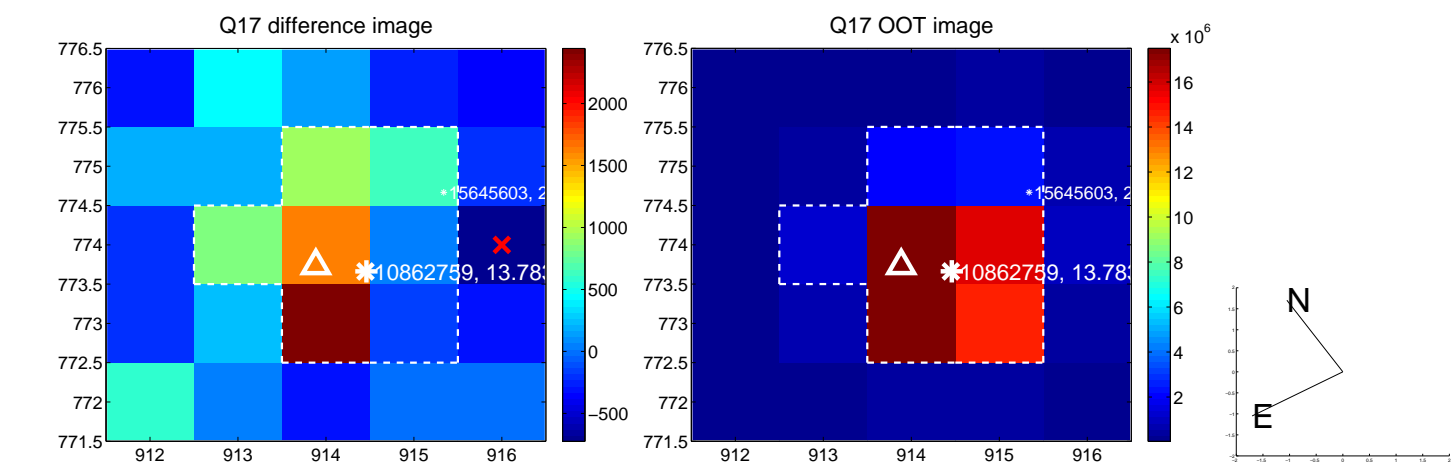
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



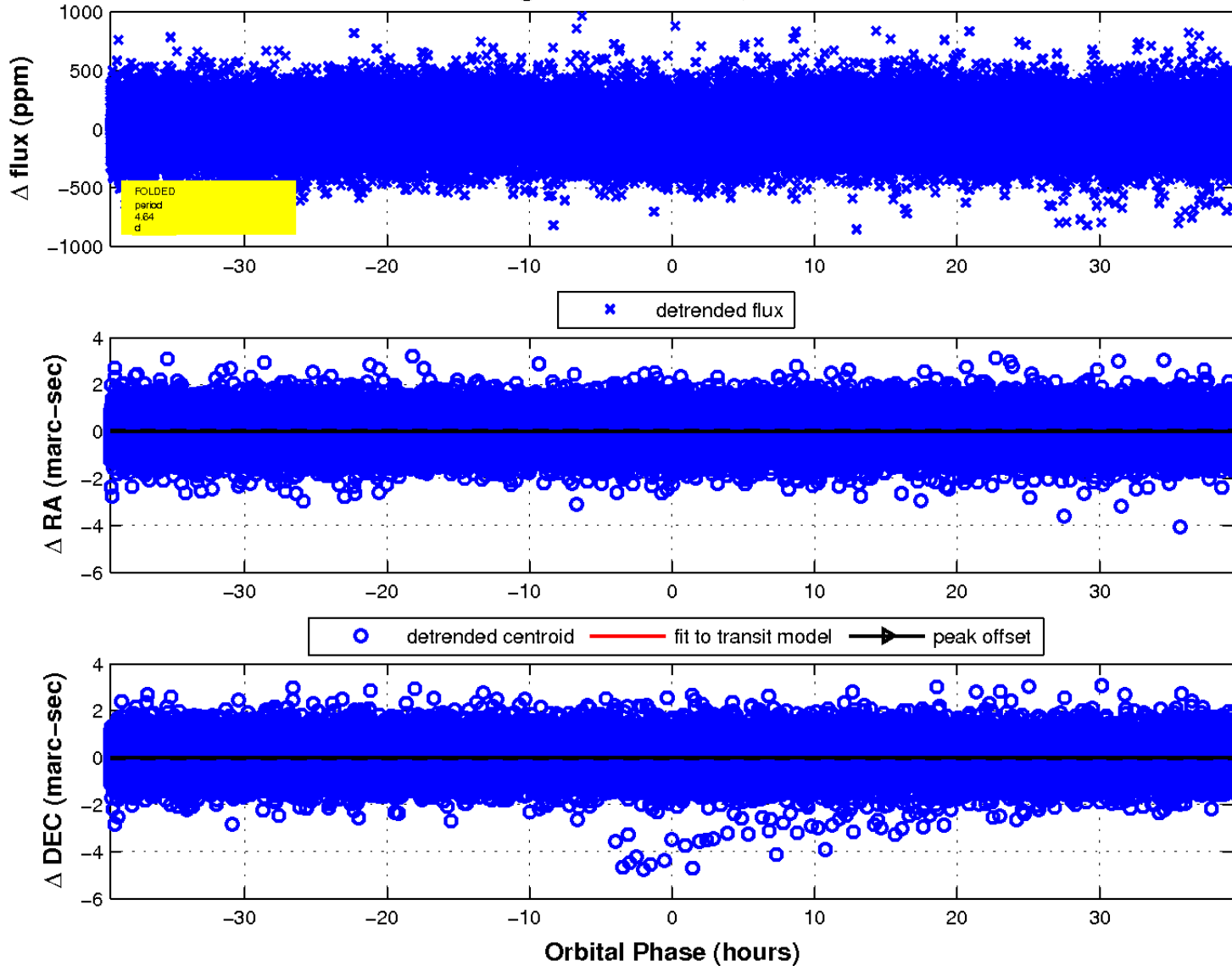
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



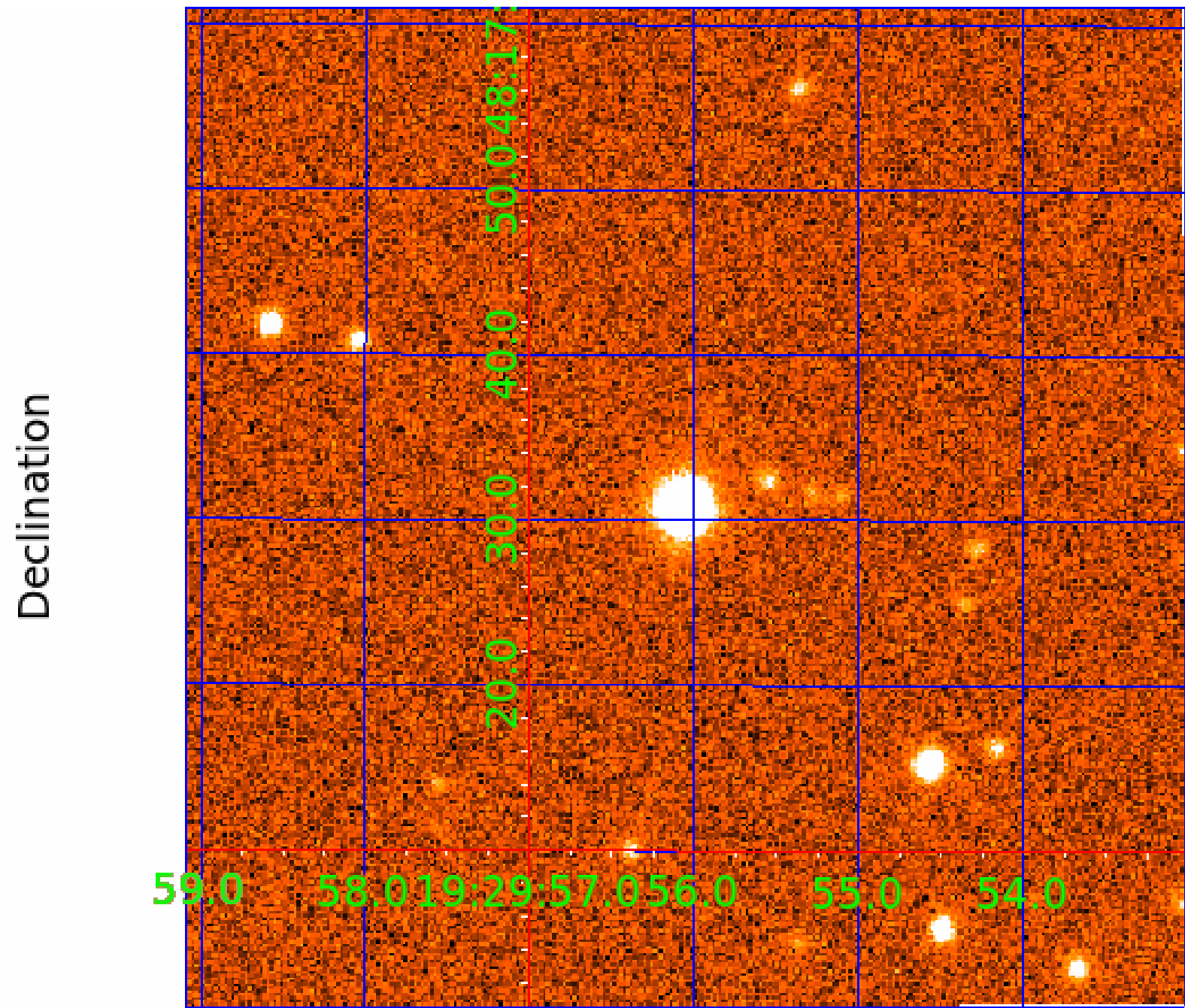
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



fluxWeightedCentroids, Planet 4 of 5



UKIRT Image



KIC 010862759

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})
010862759-01	OBS	8035.01	29.485669	151.865142	111.2	4.394	8.3	8.5	1.41	6870	1.70	93.49
010862759-02	OBS	No	4.637444	132.384216	21.9	17.312	7.7	5.9	1.41	6870	0.82	1101.23
010862759-03	OBS	No	206.911847	183.520322	201.3	7.412	10.7	6.1	1.41	6870	2.28	6.96
010862759-04	OBS	No	4.637125	134.770067	36.5	13.145	9.5	10.2	1.41	6870	0.96	1101.33
010862759-05	OBS	No	192.379959	208.232568	149.2	11.834	9.8	4.9	1.41	6870	1.75	7.67

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010862759-01	OBS	PC	0.85	0	0	0	0	NO_COMMENT
010862759-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
010862759-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010862759-04	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD
010862759-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST

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

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

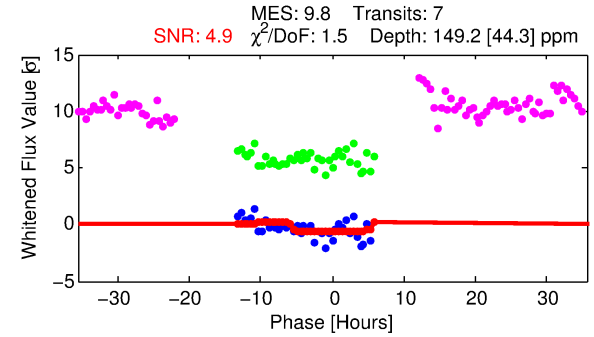
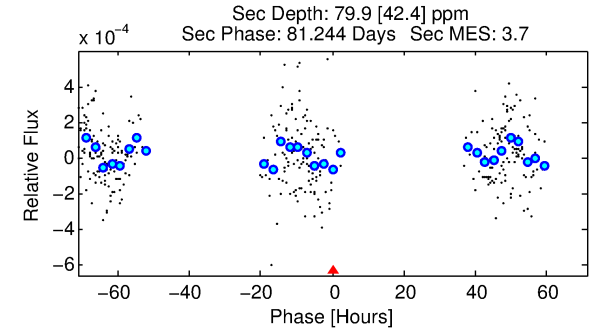
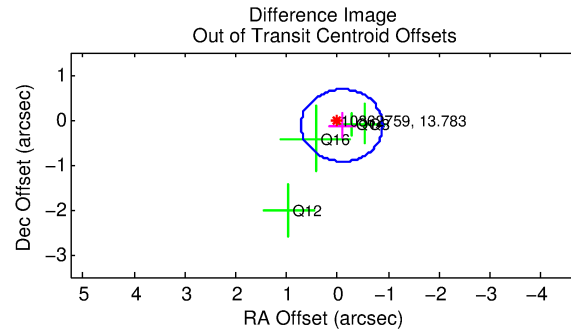
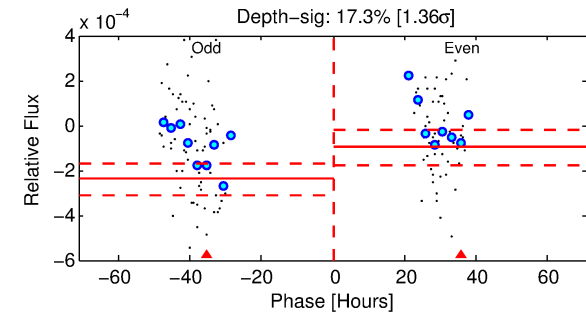
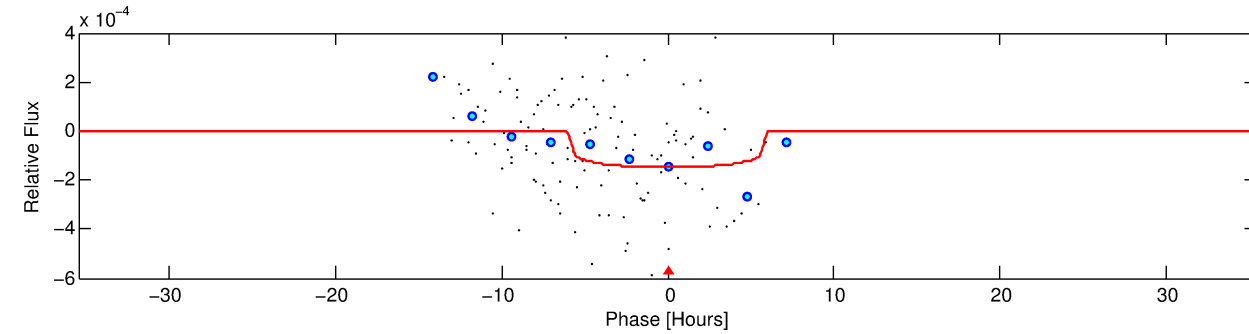
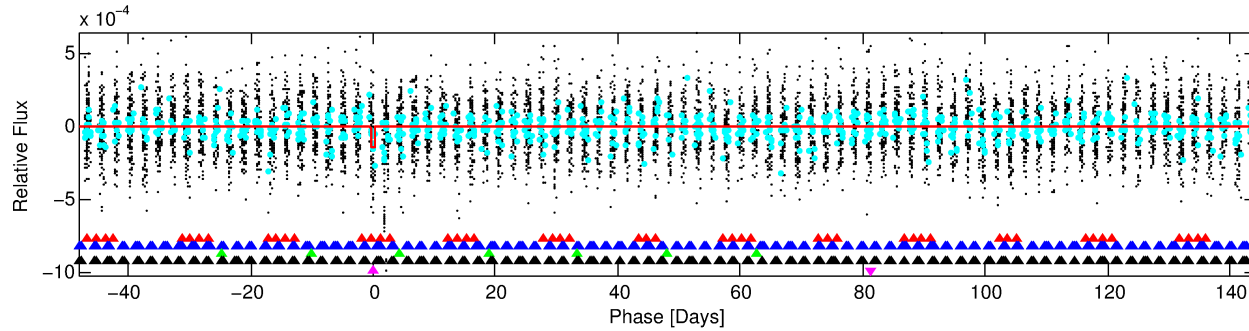
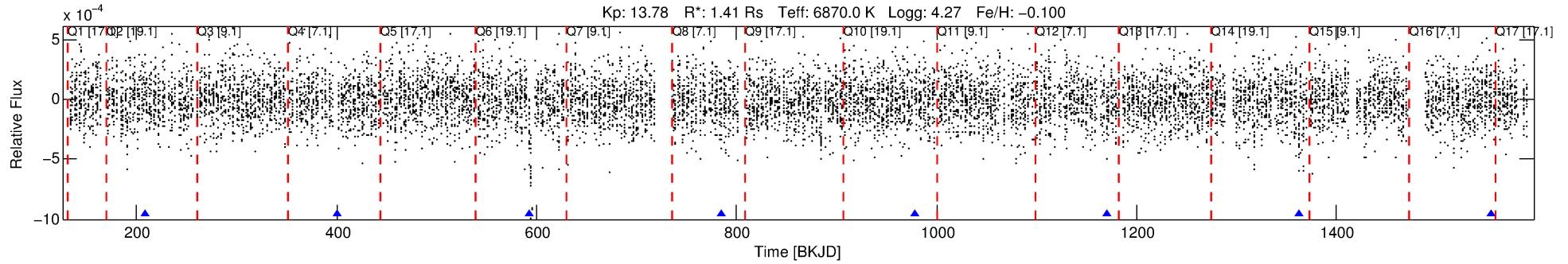
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010862759-05

No Significant Match Found

DV One-Page Summary

KIC: 10862759 Candidate: 5 of 5 Period: 192.380 d



DV Fit Results:

Period = 192.37996 [0.00647] d
Epoch = 208.2326 [0.0353] BKJD
Rp/R* = 0.0114 [0.0290]
a/R* = 119.63 [1702.38]
b = 0.31 [42.03]
Seff = 7.67 [3.20]
Teq = 424 [44] K
Rp = 1.75 [4.49] Re
a = 0.7178 [0.1999] AU
Ag = 7401.29 [37946.60] [0.20 σ]
Teffp = 6085 [7781] K [0.73 σ]

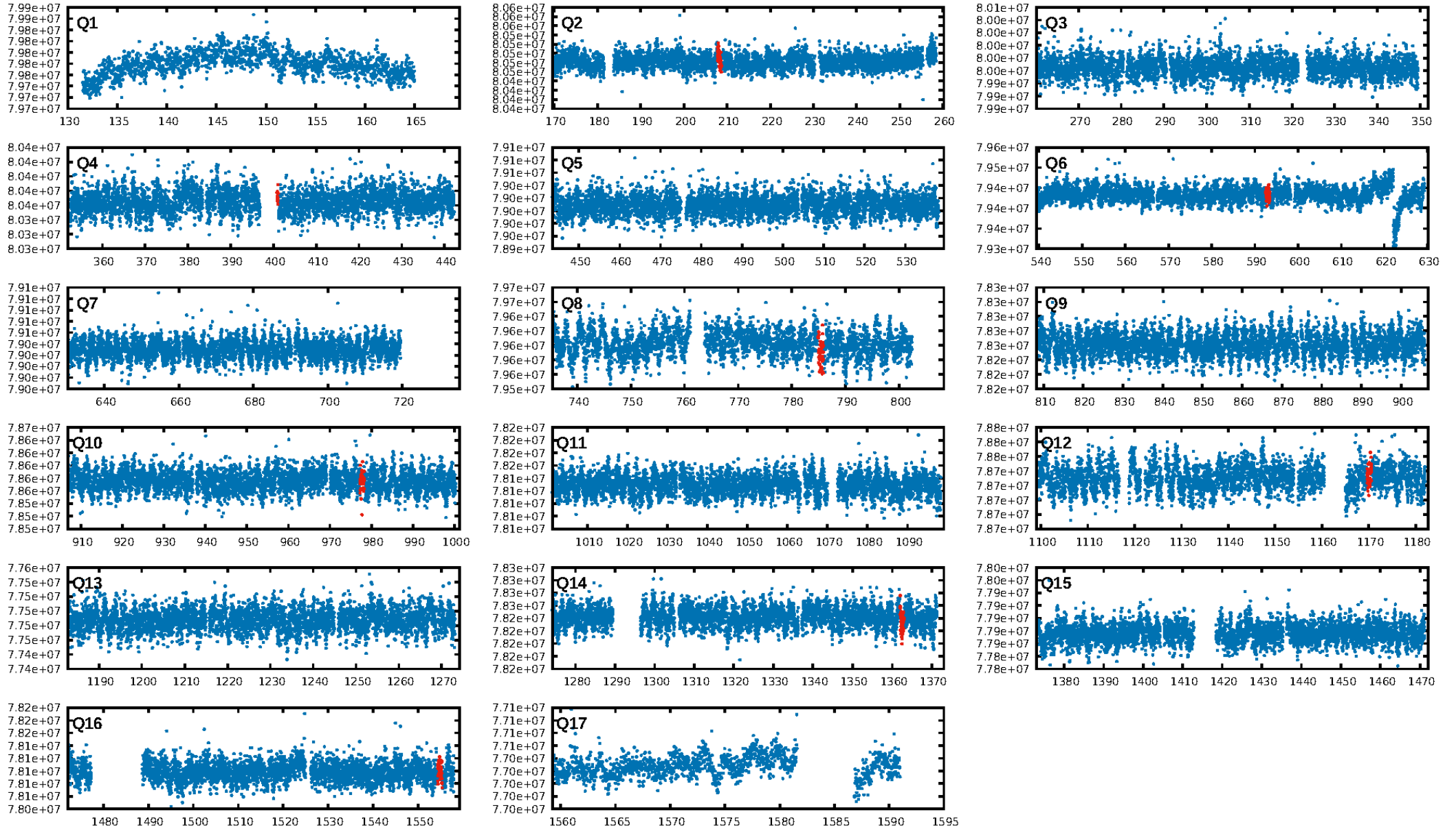
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [309.70 σ]
LongPeriod-sig: 100.0% [24.98 σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.80e-17
RollingBand-fgt: 1.00 [7/7]
GhostDiagnostic-chr: 0.005566
Centroid-sig: 20.2%
Centroid-so: 1.206 arcsec [1.03 σ]
OotOffset-rm: 0.155 arcsec [0.58 σ]
KicOffset-rm: 0.138 arcsec [0.39 σ]
OotOffset-st: 1/0/3/0 [4]
KicOffset-st: 1/0/3/0 [4]
DiffImageQuality-fgm: 0.75 [3/4]
DiffImageOverlap-fno: 0.00 [0/7]

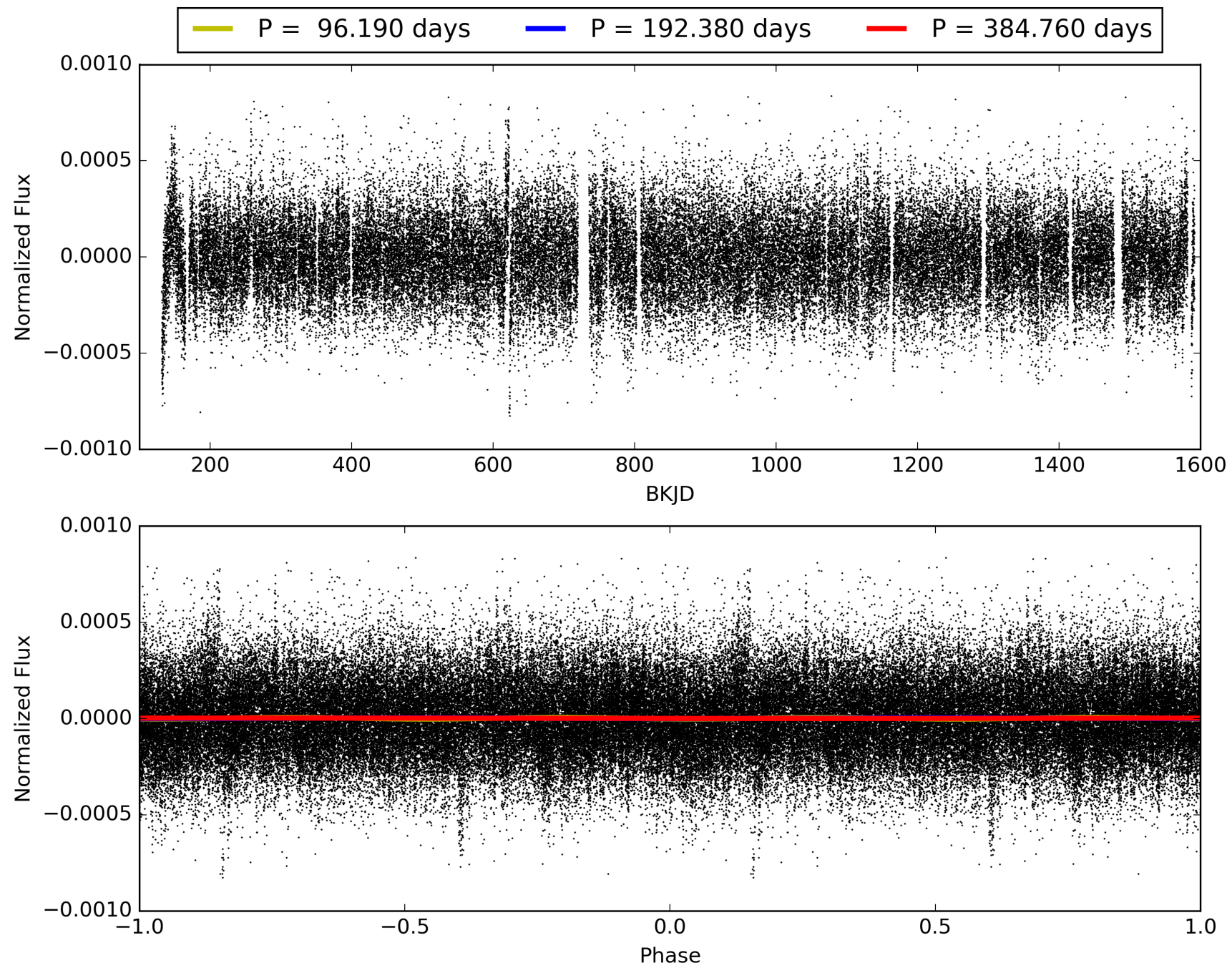
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 09:26:17 Z

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

TCE 010862759-05, PDC Light Curves

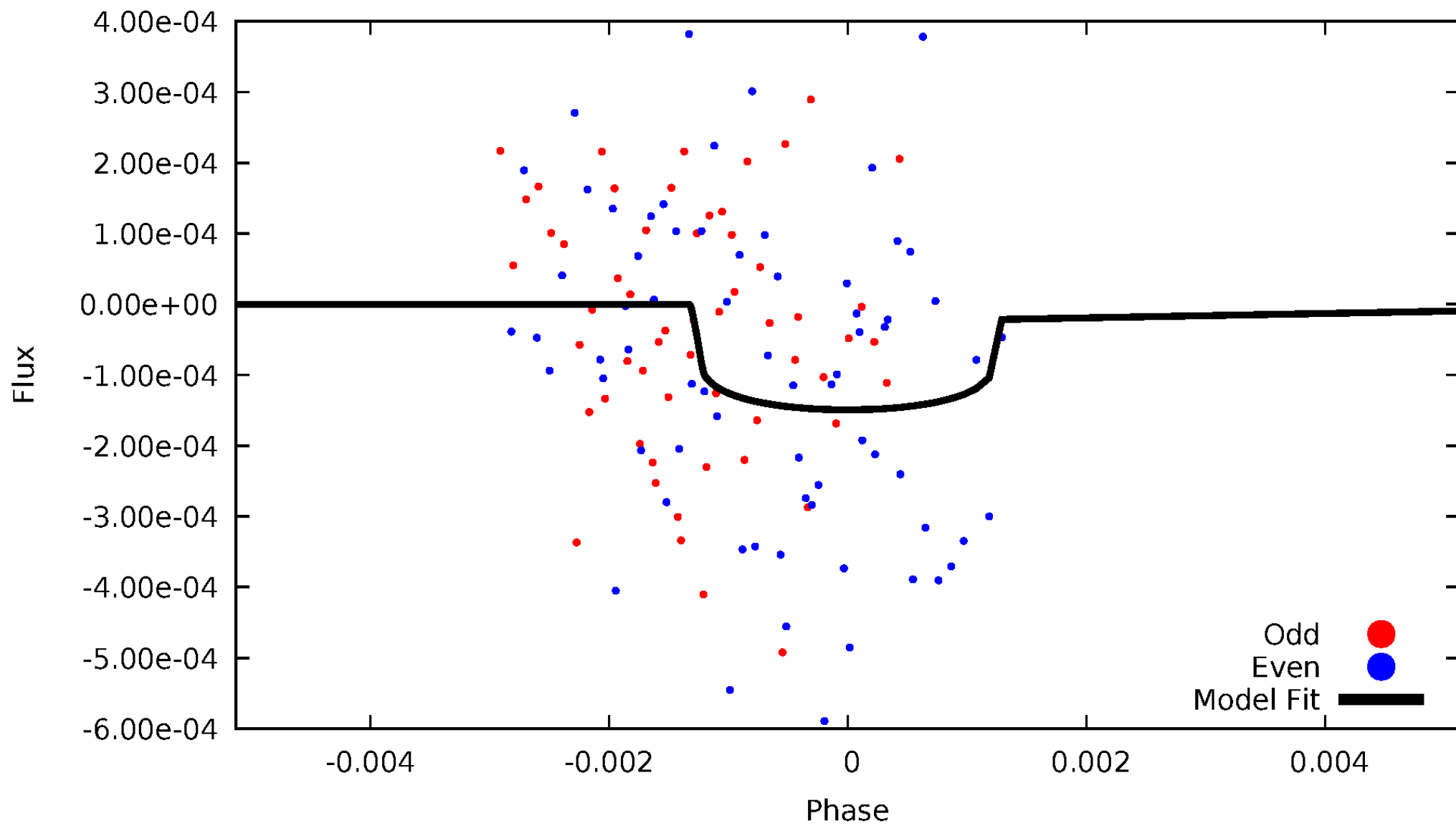


TCE 010862759-05



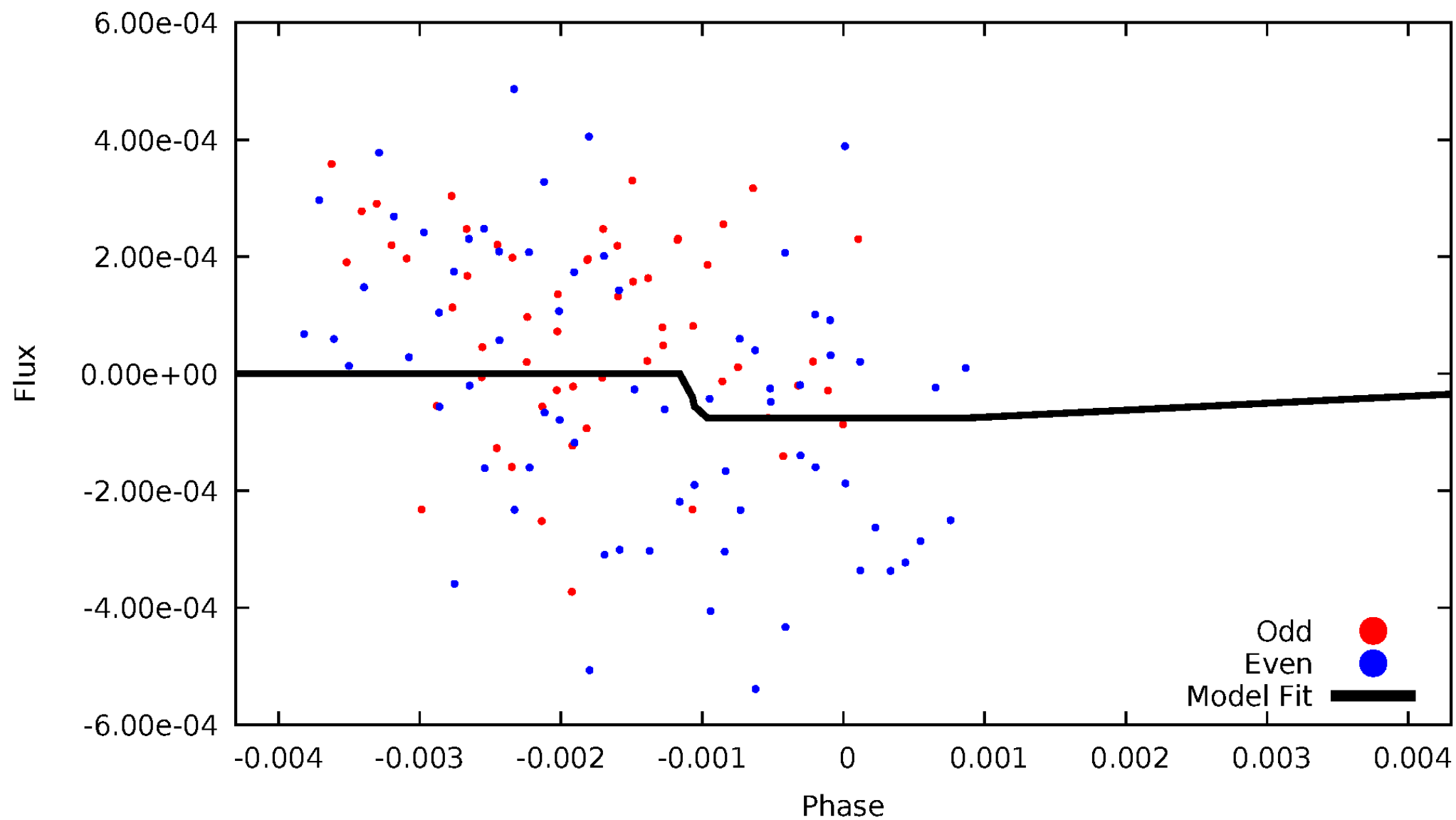
DV Odd/Even

TCE 010862759-05



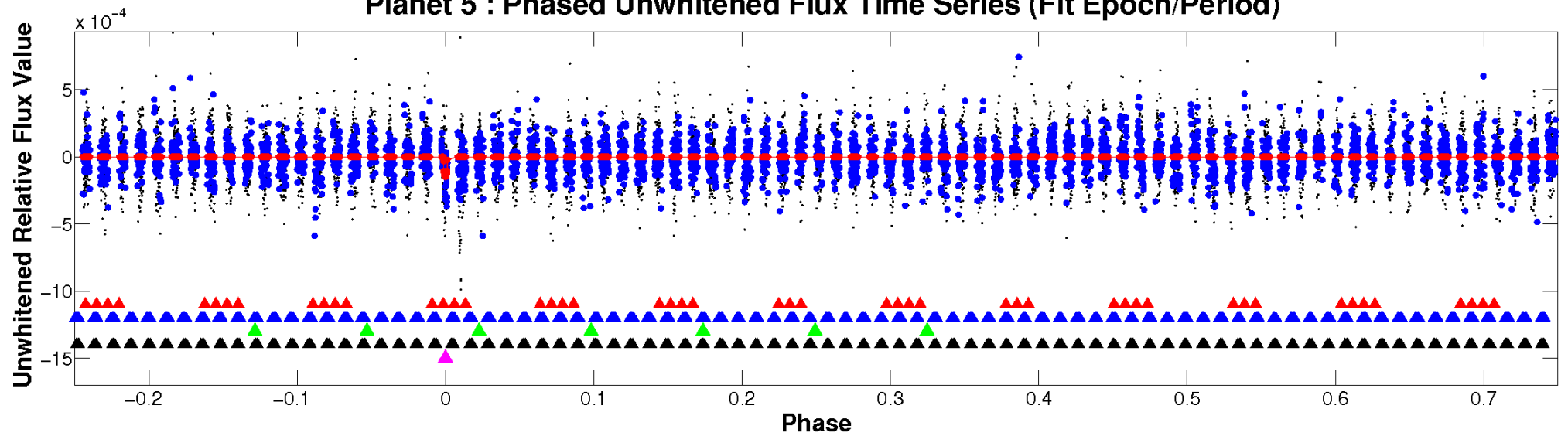
ALT Odd/Even

TCE 010862759-05

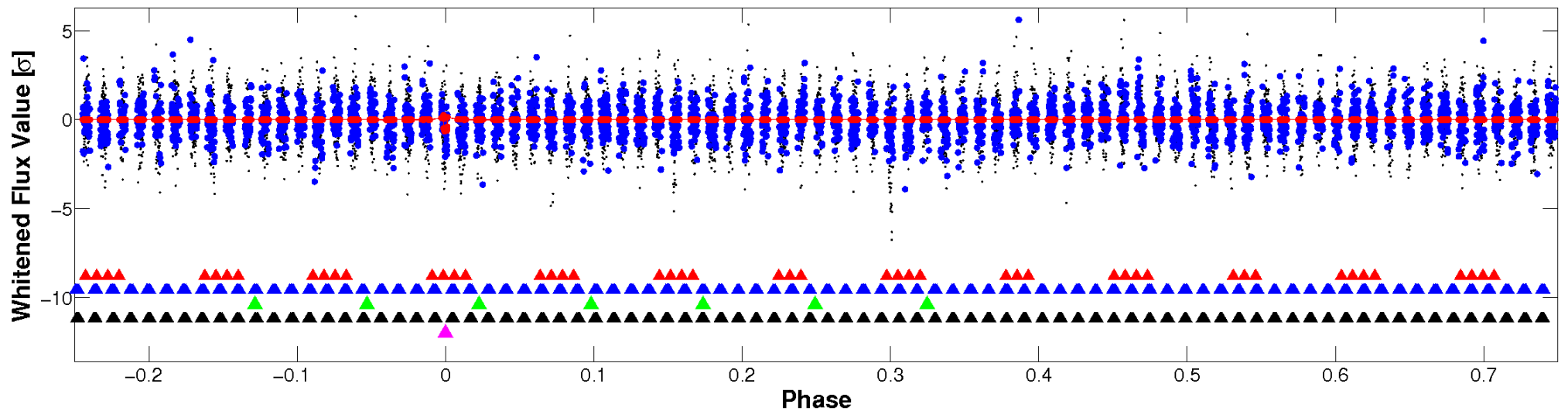


Non-Whitened Vs. Whitened Light Curve

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

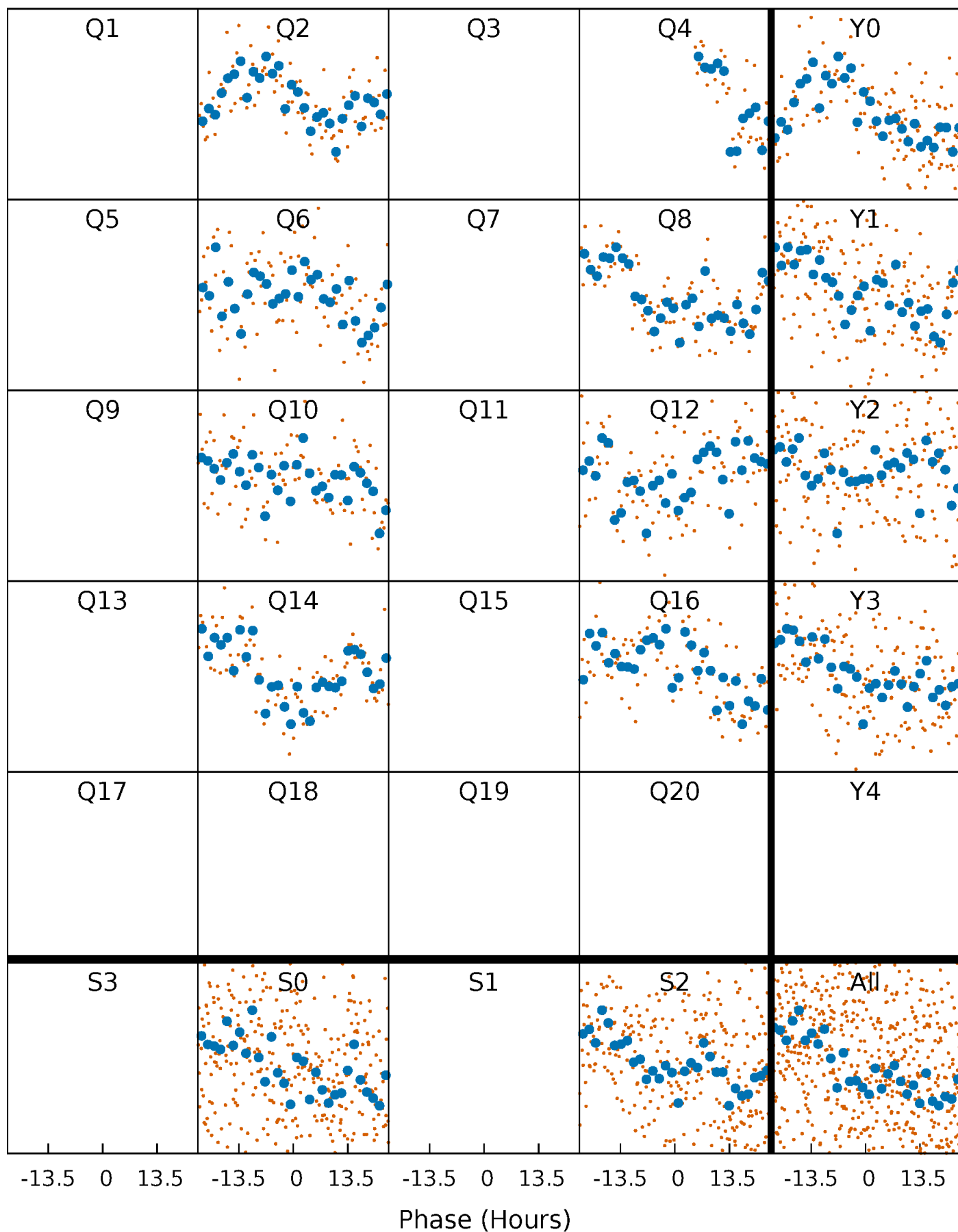


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



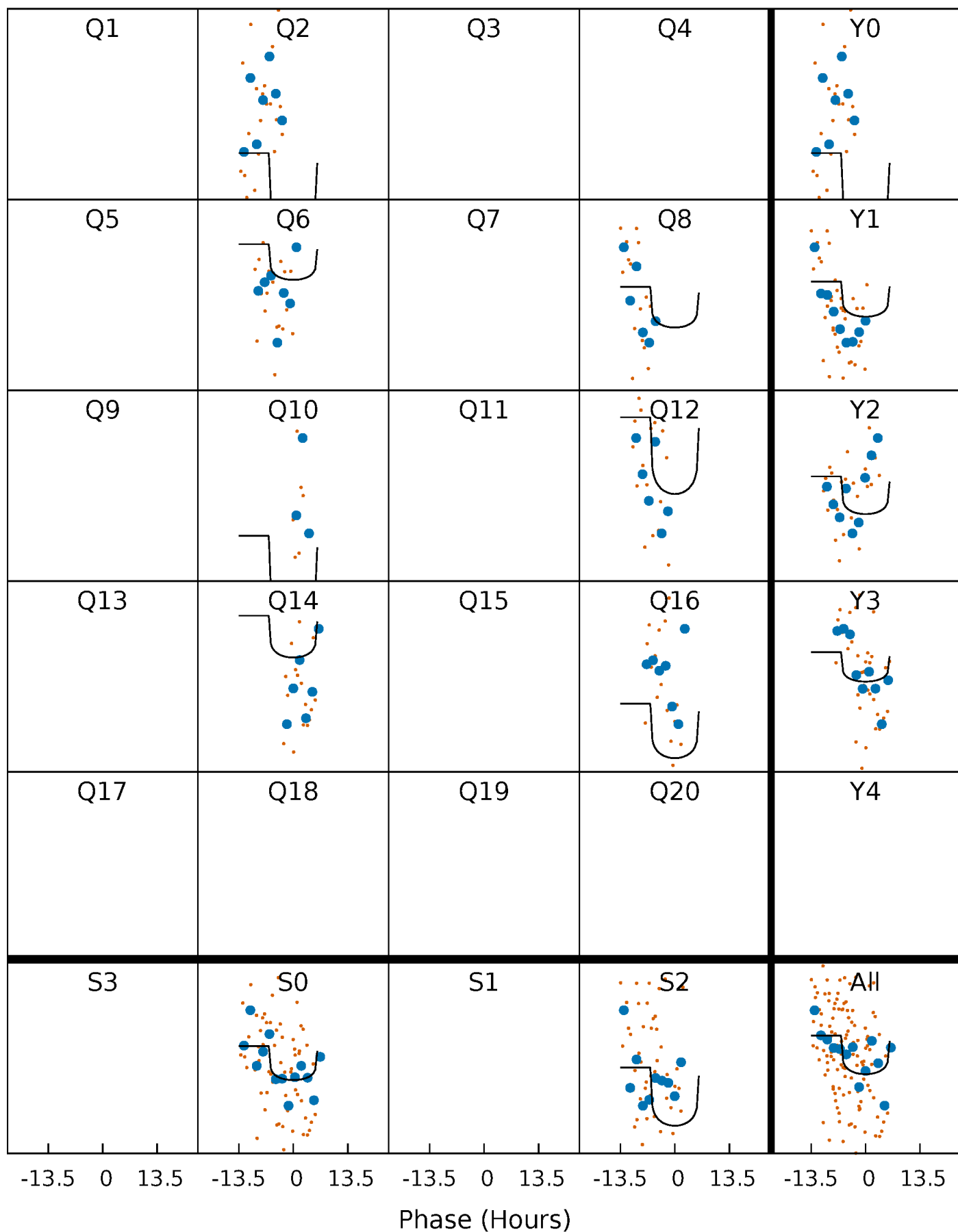
PDC Quarter-Phased Transit Curves

TCE 010862759-05 $P=192.379959$ Days $T_0=208.232568$ (BKJD)



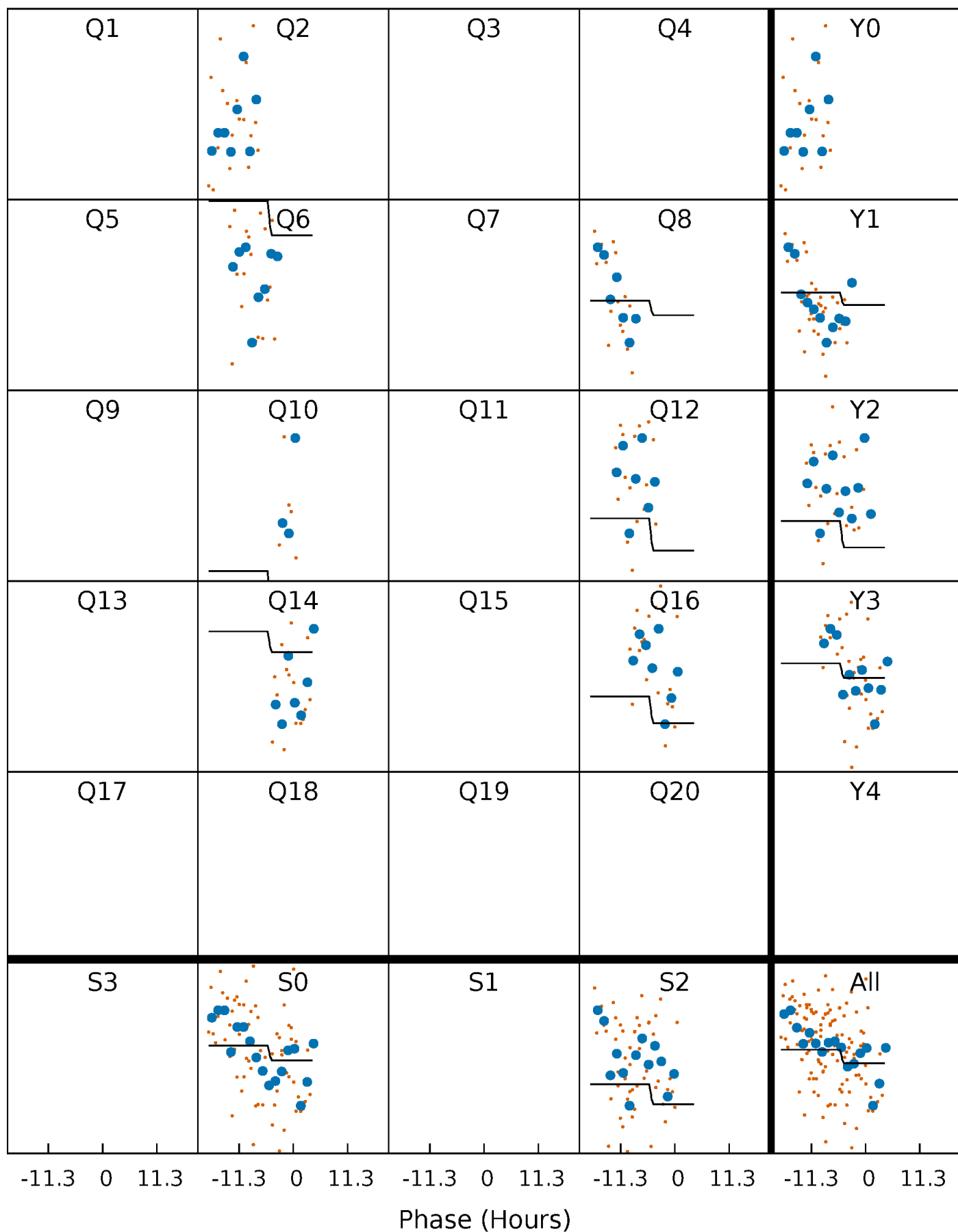
DV Quarter-Phased Transit Curves

TCE 010862759-05 $P=192.379959$ Days $T_0=208.232568$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

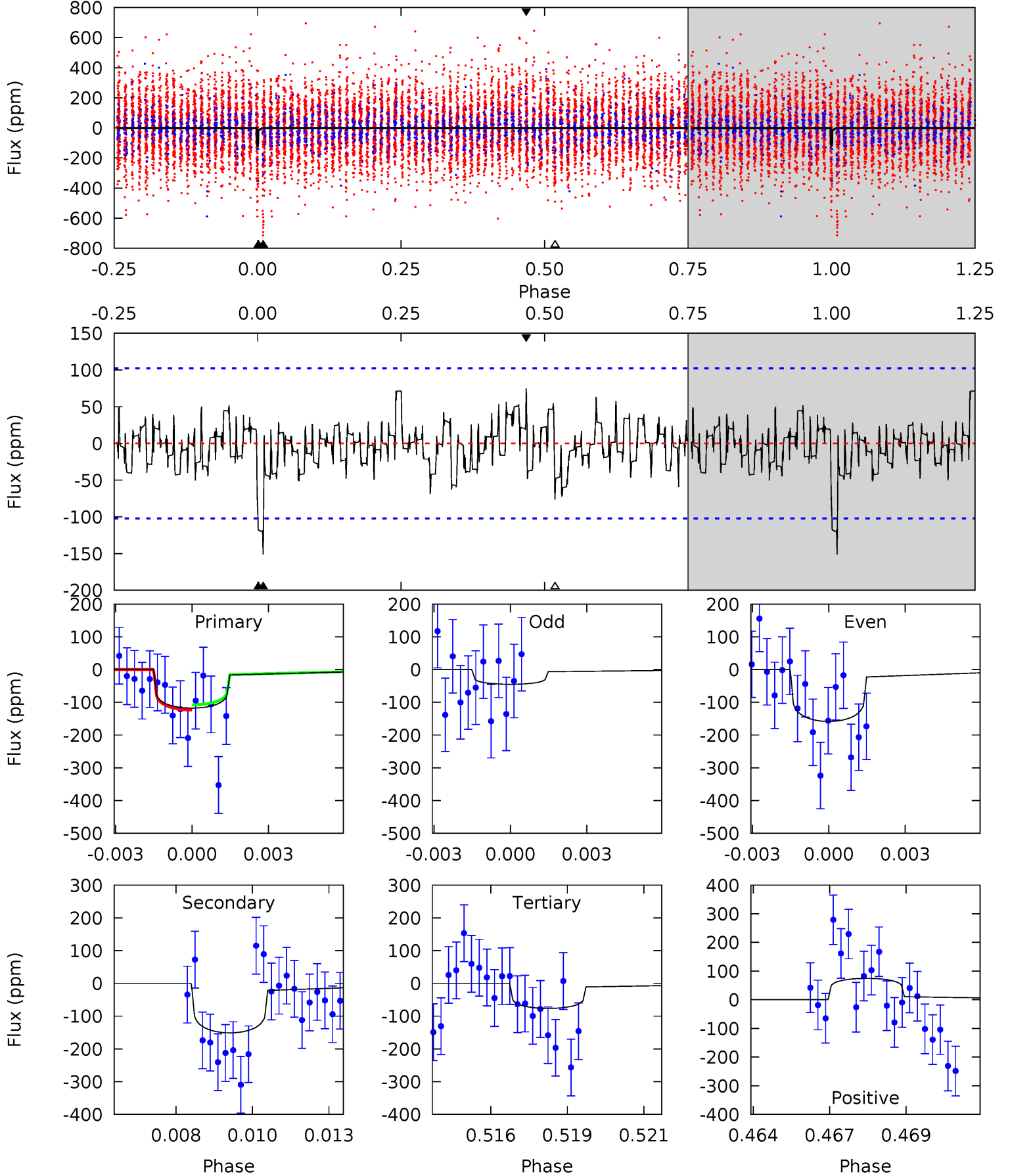
TCE 010862759-05 P=192.361534 Days $T_0=208.424996$ (BKJD)



DV Model-Shift Uniqueness Test

010862759-05, $P = 192.379959$ Days, $E = 15.852609$ Days

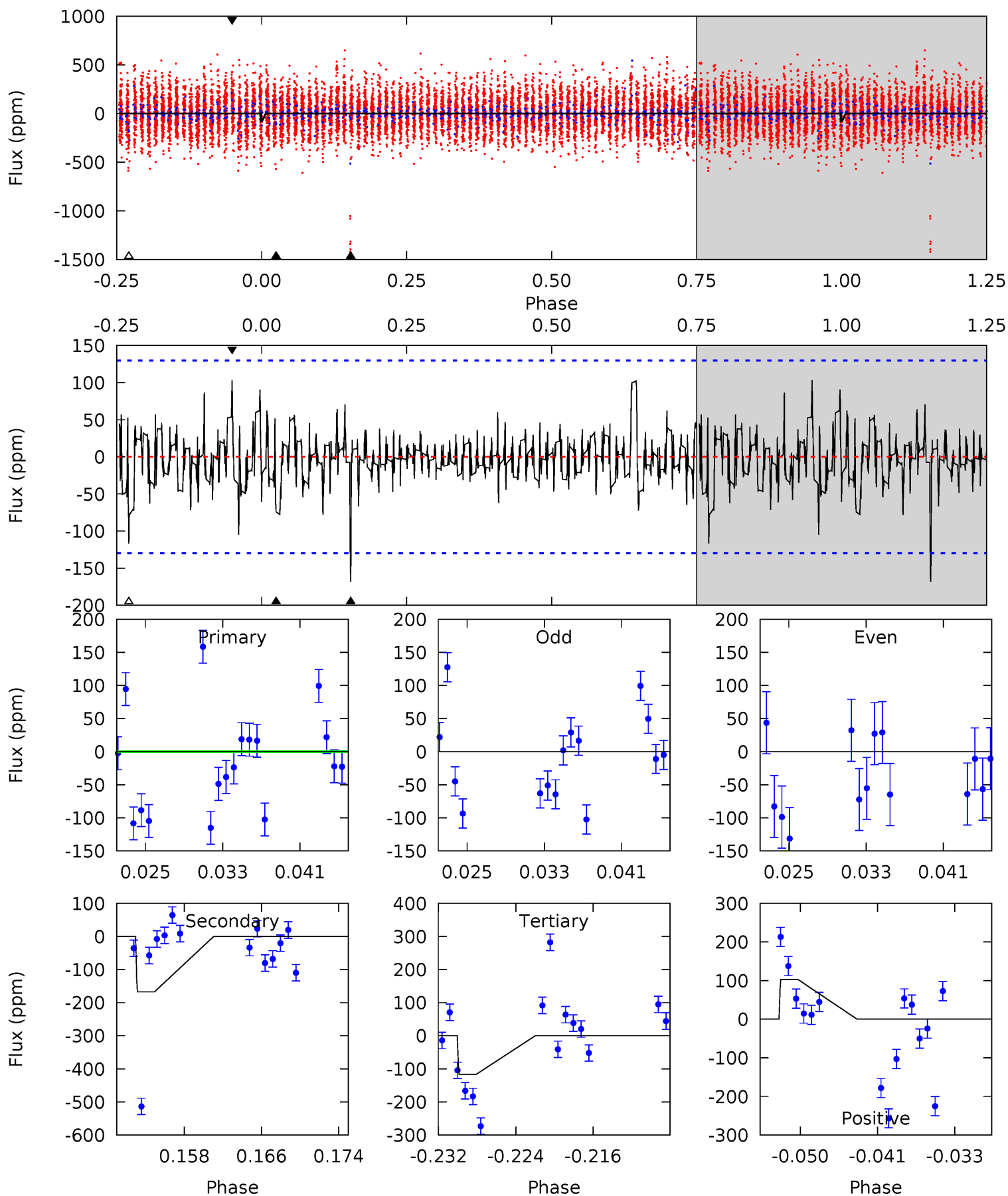
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.09	7.81	3.95	3.86	5.28	3.01	1.26	2.14	2.23	3.86	3.95	2.86	0.66	0.33	0.39



Alt Model-Shift Uniqueness Test

010862759-05, P = 192.361534 Days, E = 16.063462 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.90	6.55	4.56	4.03	5.06	2.64	1.02	-1.66	-1.12	1.99	2.52	1.42	-1.62	0.38	0.98



Stellar Parameters For KIC 010862759

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6870^{+168}_{-264}	$4.266^{+0.087}_{-0.203}$	$-0.100^{+0.250}_{-0.350}$	$1.407^{+0.487}_{-0.209}$	$1.337^{+0.201}_{-0.201}$	$0.677^{+0.279}_{-0.378}$
	+2%/-4%	+2%/-5%	+250%/-350%	+35%/-15%	+15%/-15%	+41%/-56%
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 010862759-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-151 ± 19	$3.77^{+3.91}_{-2.51}$	599^{+44}_{-34}	4981^{+3957}_{-1152}	3016^{+24918}_{-2308}
Alt.	-168 ± 26	$3.66^{+3.82}_{-2.51}$	598^{+47}_{-34}	5162^{+4423}_{-1231}	3479^{+32339}_{-2628}

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 $A_{obs} \gg 1.0$

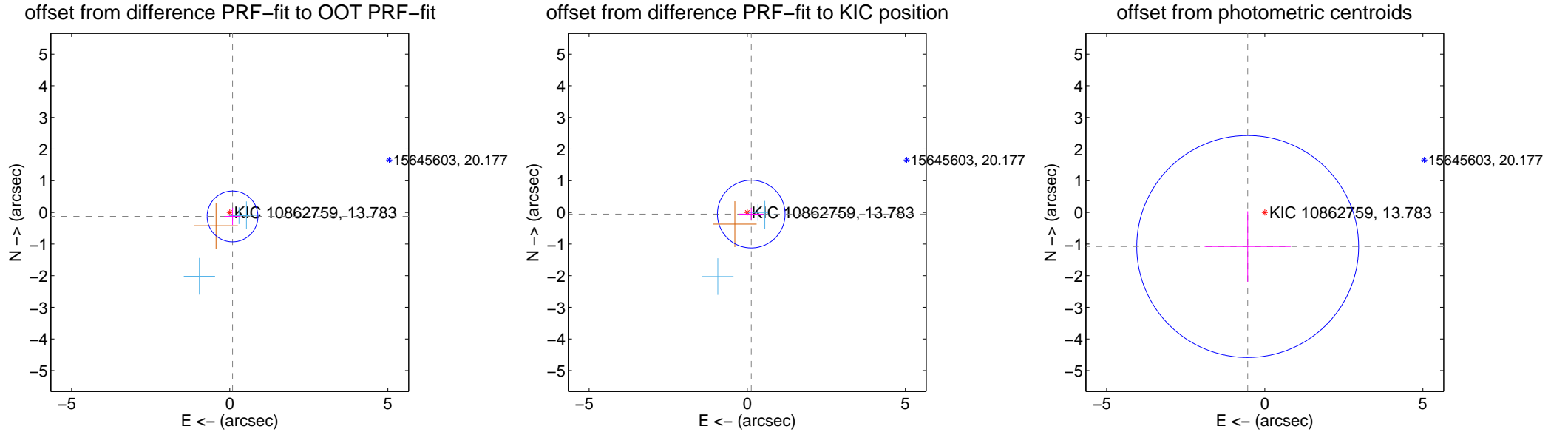
DV Centroid Data

Supplemental centroid analysis for 010862759-05. Kepler magnitude: 13.78. Transit SNR 4.92

There are 3 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.155 ± 0.268	0.58	-0.088 ± 0.256	-0.128 ± 0.273
PRF-fit source offset from KIC position	0.138 ± 0.357	0.39	-0.127 ± 0.378	-0.054 ± 0.197
photometric centroid source offset	1.21 ± 1.17	1.03	0.54 ± 1.36	-1.08 ± 1.12



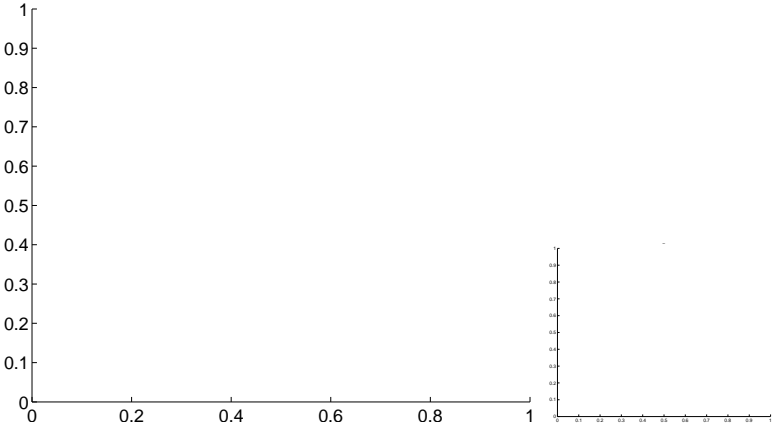
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

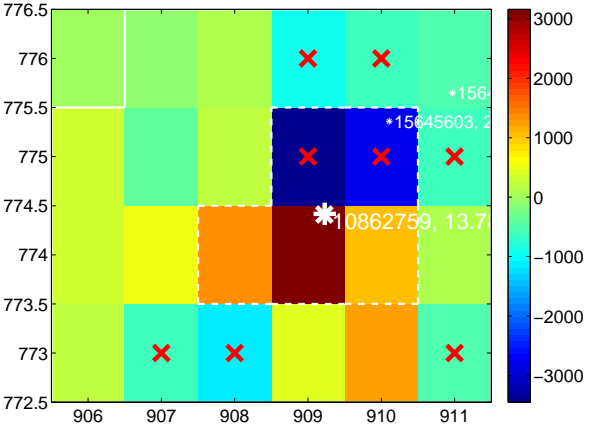
Q1 no difference image



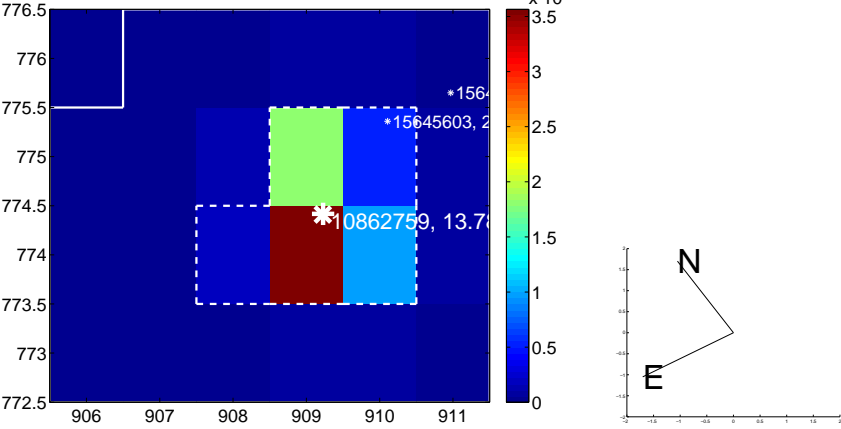
Q1 no OOT image



Q2 difference image. Poor Quality



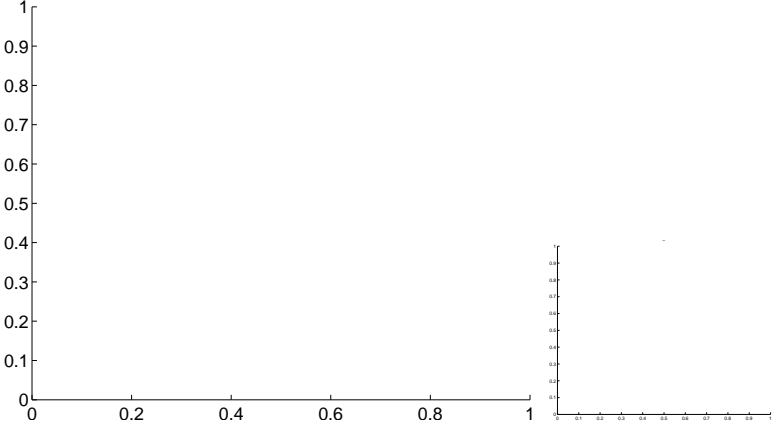
Q2 OOT image



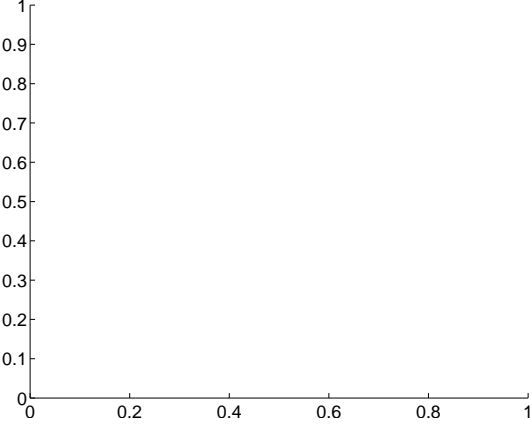
Q3 no difference image



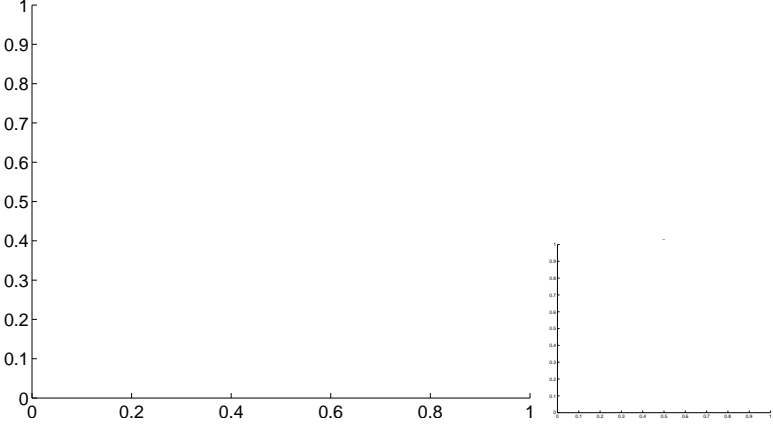
Q3 no OOT image



Q4 no difference image



Q4 no OOT image



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

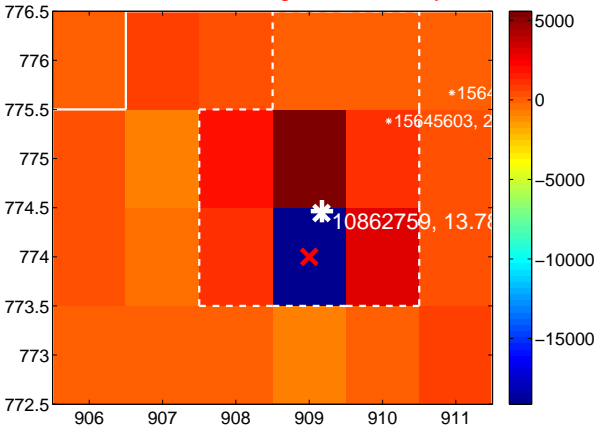
Q5 no difference image



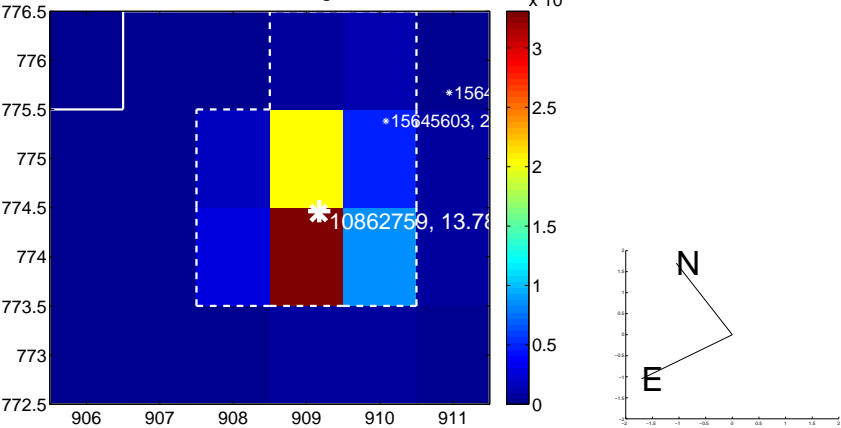
Q5 no OOT image



Q6 difference image. Poor Quality



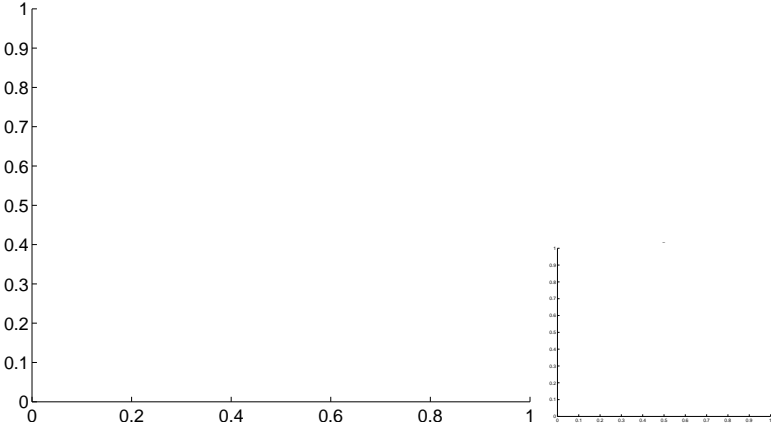
Q6 OOT image



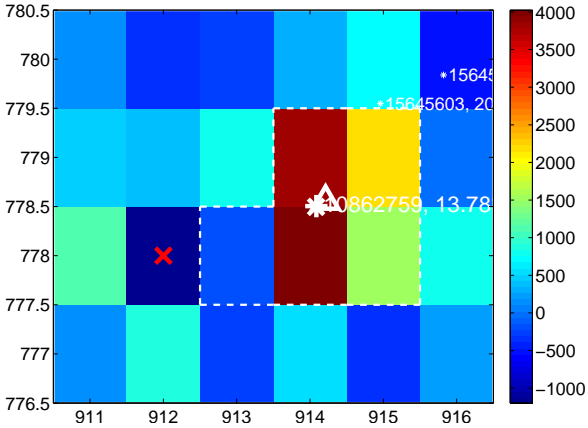
Q7 no difference image



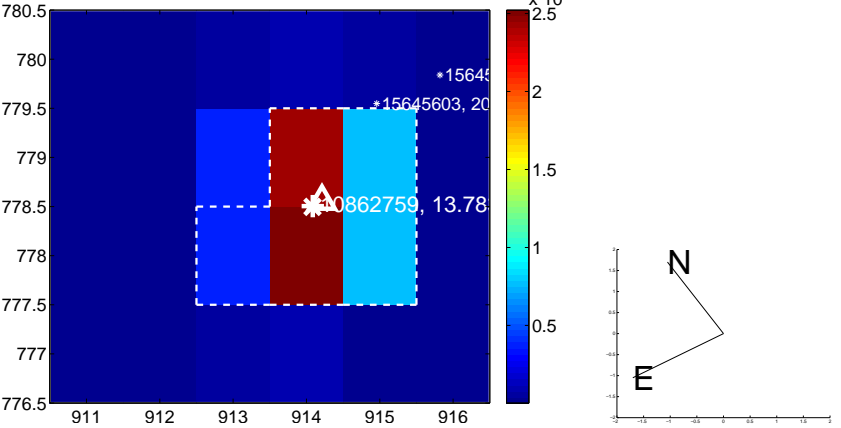
Q7 no OOT image



Q8 difference image



Q8 OOT image

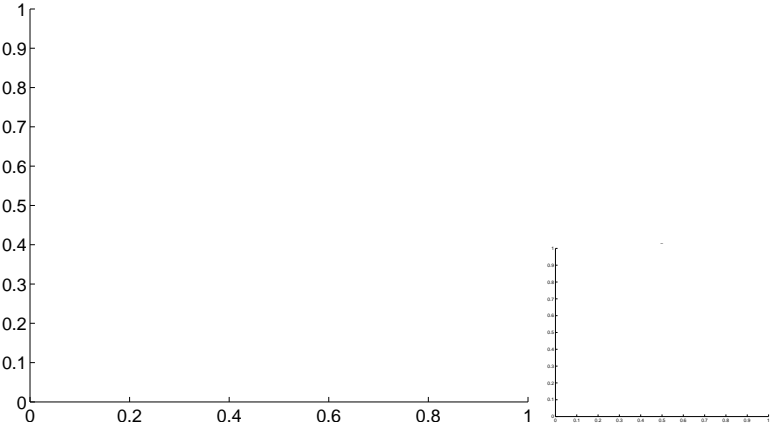


white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

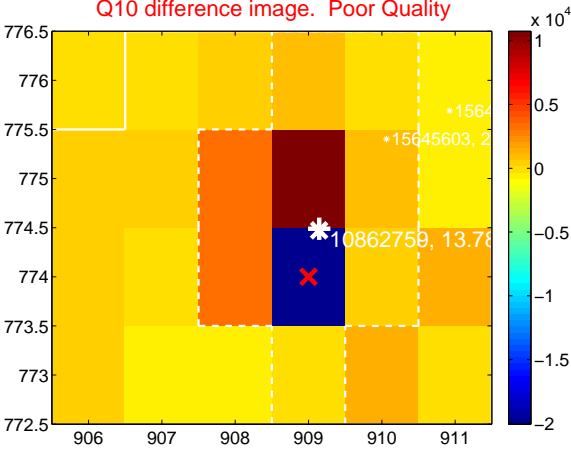
Q9 no difference image



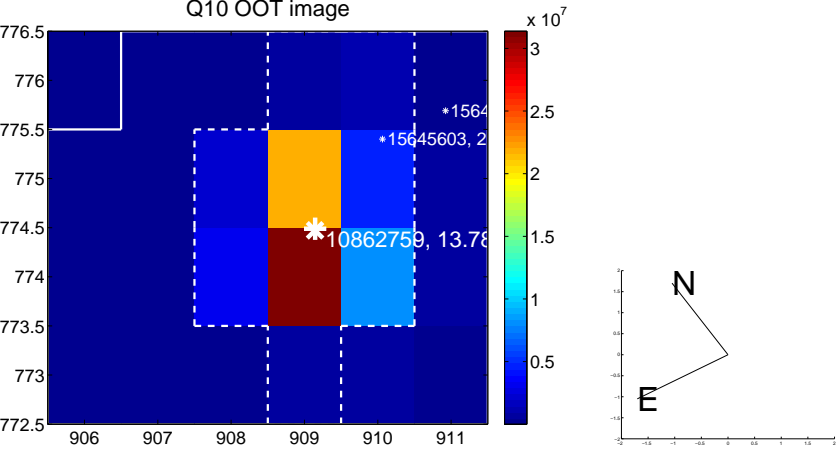
Q9 no OOT image



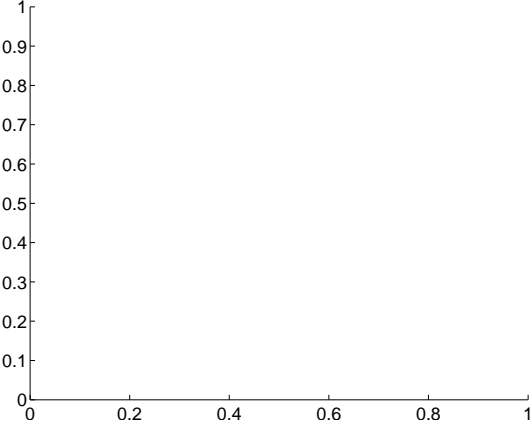
Q10 difference image. Poor Quality



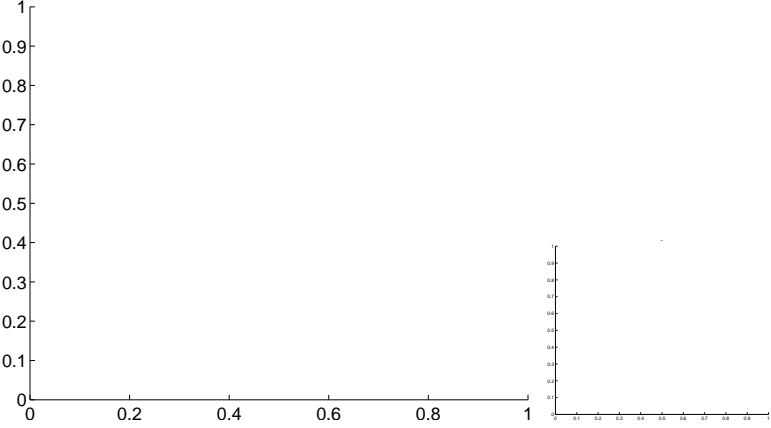
Q10 OOT image



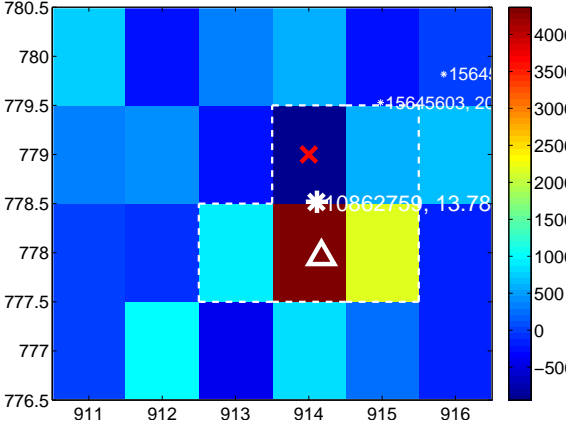
Q11 no difference image



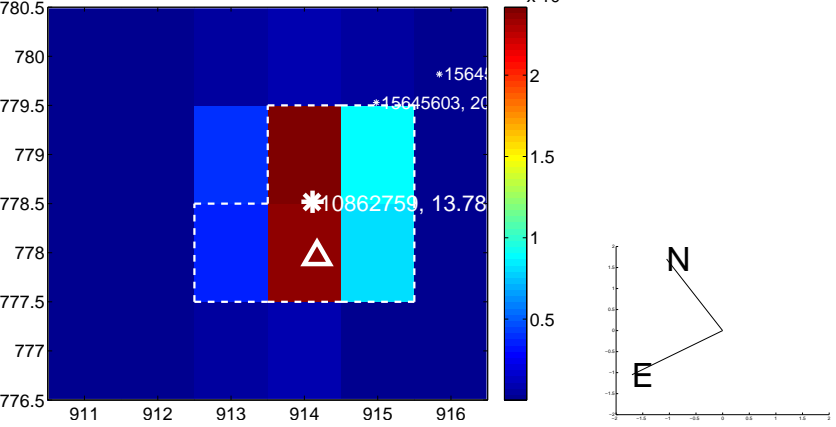
Q11 no OOT image



Q12 difference image

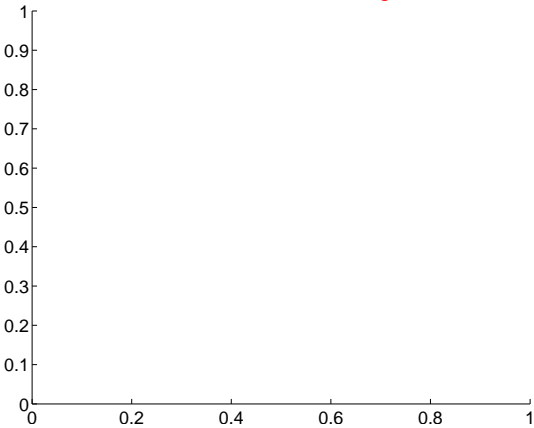


Q12 OOT image

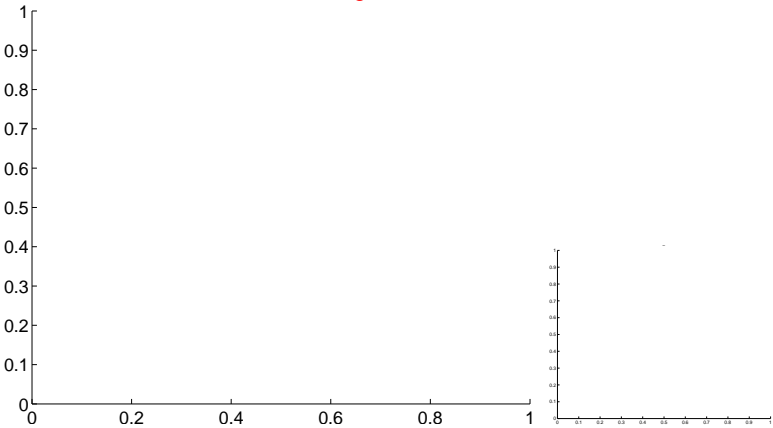


white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

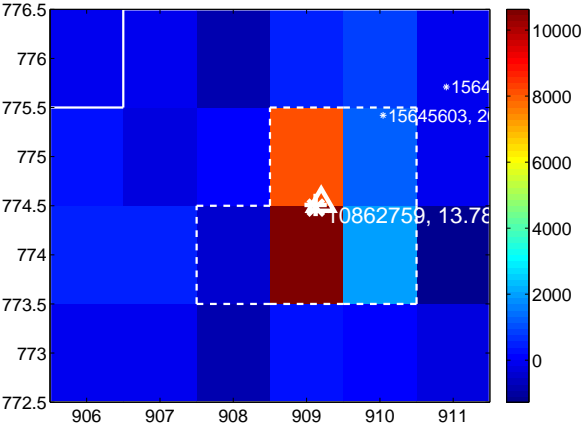
Q13 no difference image



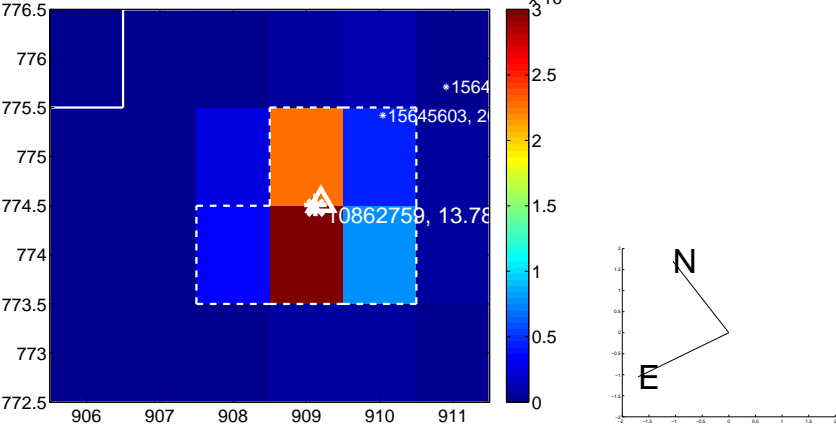
Q13 no OOT image



Q14 difference image



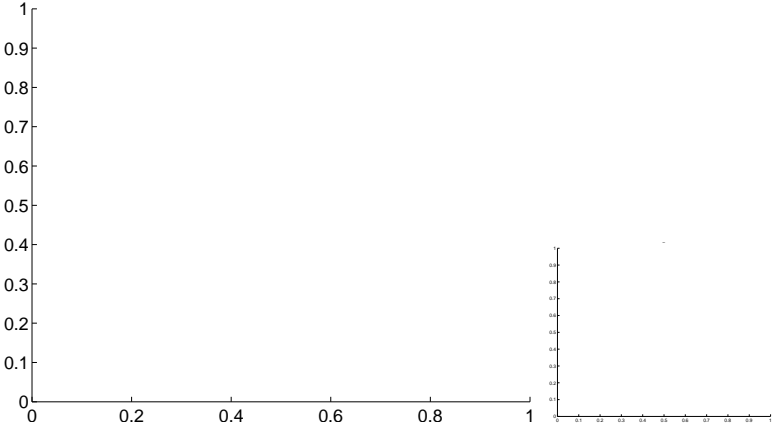
Q14 OOT image



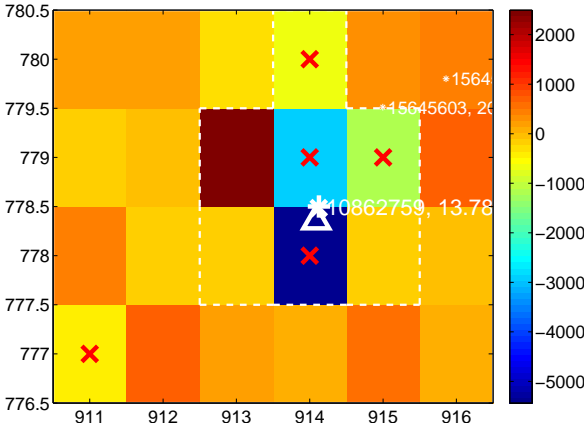
Q15 no difference image



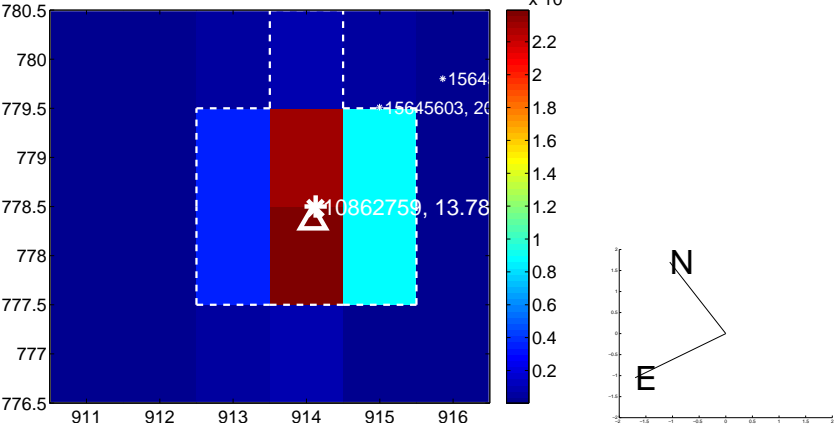
Q15 no OOT image



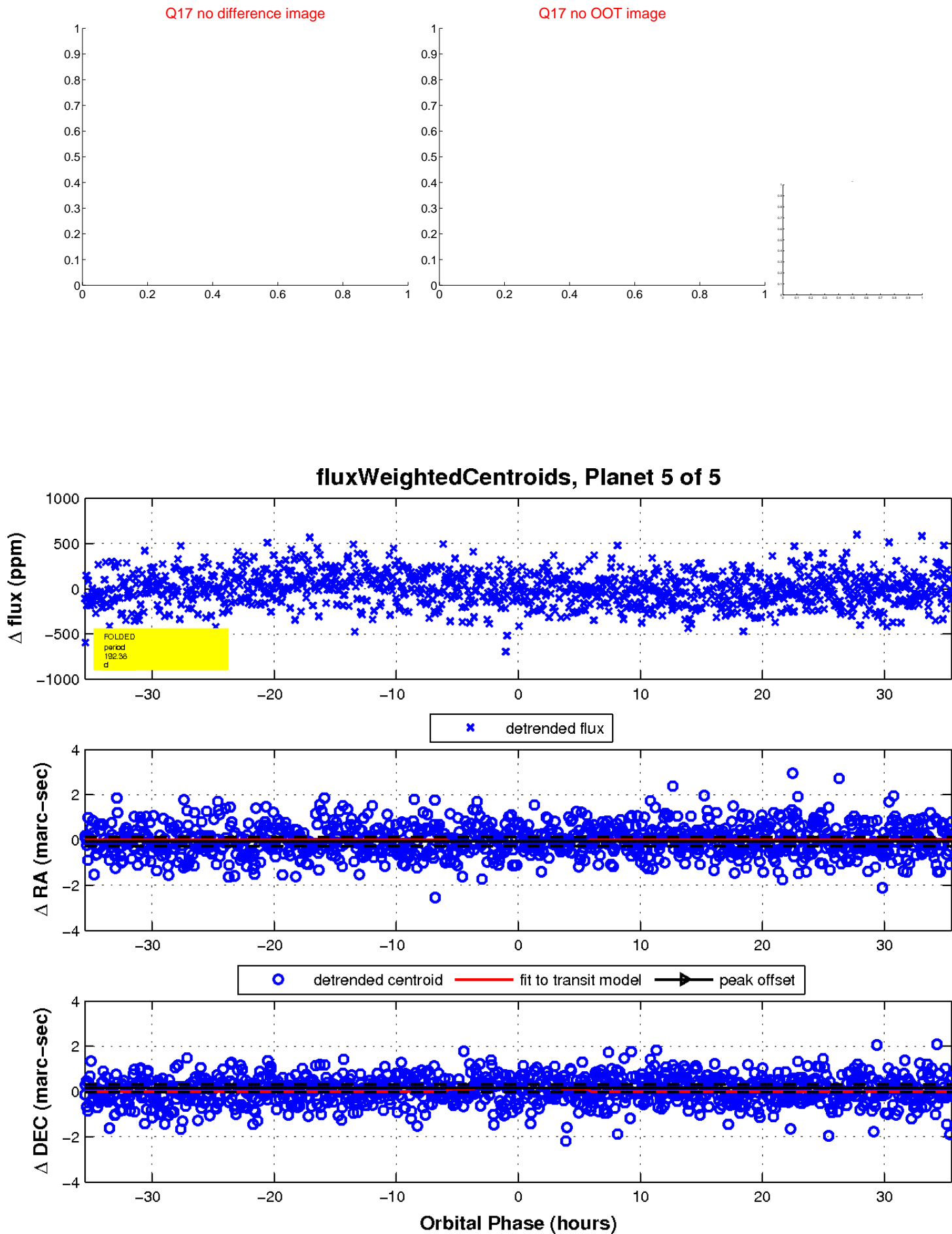
Q16 difference image. Poor Quality



Q16 OOT image



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



UKIRT Image

