

KIC 002860851

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})
002860851-01	OBS	No	1.196773	132.011602	42.1	6.790	11.9	13.8	2.83	8902	1.87	59131.00
002860851-02	OBS	No	69.282777	161.361756	489.5	2.230	9.4	9.2	2.83	8902	6.99	264.04
002860851-03	OBS	No	92.352446	142.271992	498.9	1.752	8.9	8.4	2.83	8902	11.89	179.98
002860851-04	OBS	No	65.098318	145.699157	361.1	1.847	9.2	9.2	2.83	8902	6.29	286.90

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002860851-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—CENT_SATURATED
002860851-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
002860851-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
002860851-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

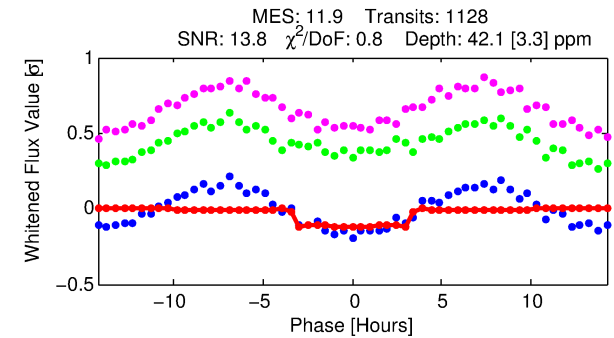
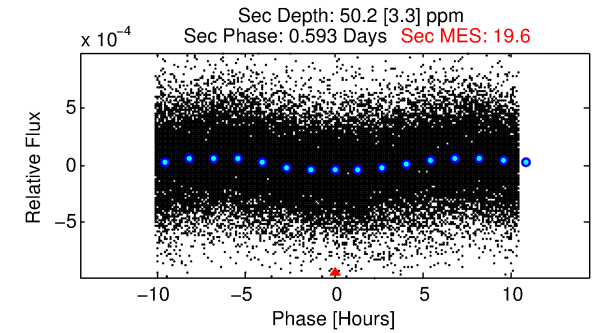
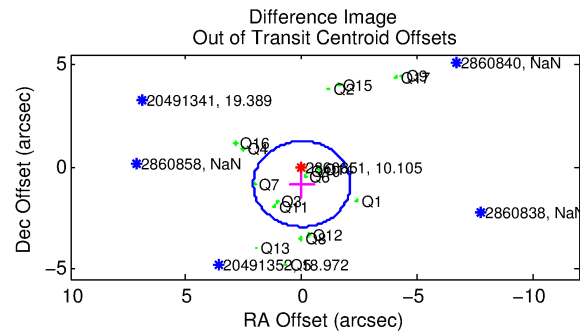
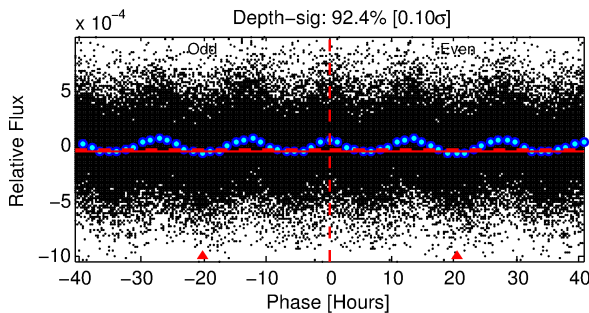
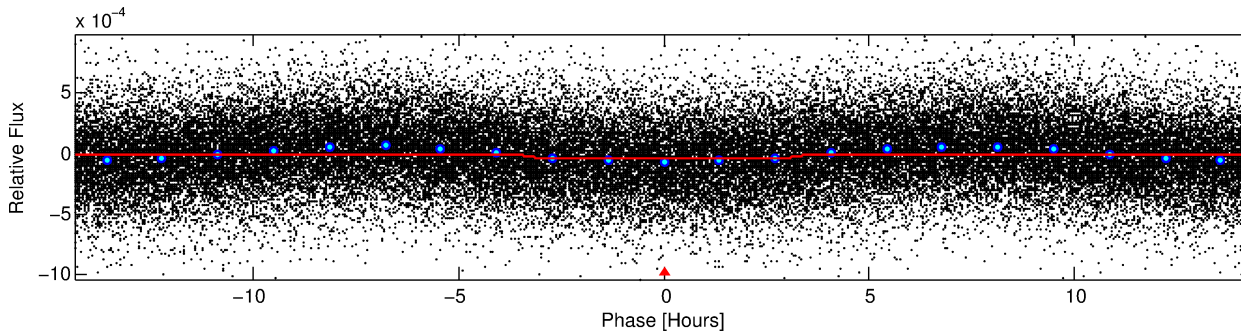
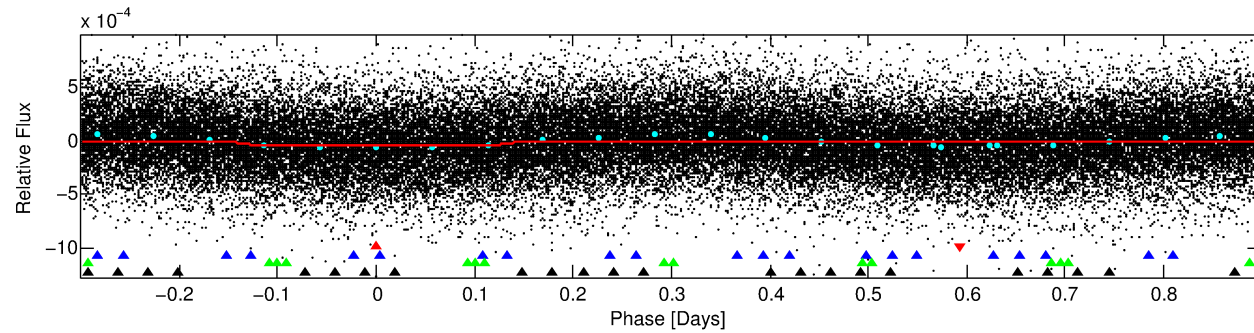
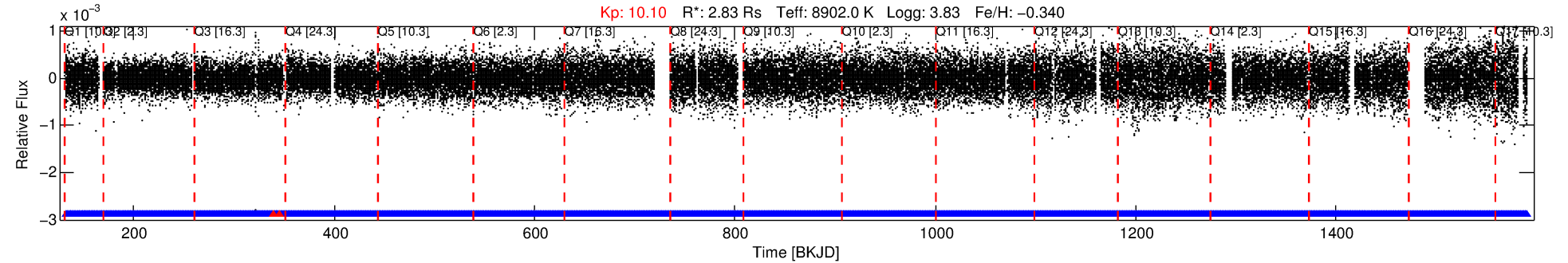
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002860851-01

No Significant Match Found

DV One-Page Summary

KIC: 2860851 Candidate: 1 of 4 Period: 1.197 d



DV Fit Results:

Period = 1.19677 [0.00001] d
Epoch = 132.0116 [0.0030] BKJD
 $R_p/R^* = 0.0061$ [0.0030]
 $a/R^* = 1.47$ [2.48]
 $b = 0.19$ [15.93]
 $S_{\text{eff}} = 59130.99$ [42640.19]
 $T_{\text{eq}} = 3976$ [717] K
 $R_p = 1.87$ [1.20] R_e
 $a = 0.0276$ [0.0112] AU
 $A_g = 5.98$ [7.04] [0.71 σ]
 $T_{\text{eff}} = 9614$ [2470] K [2.19 σ]

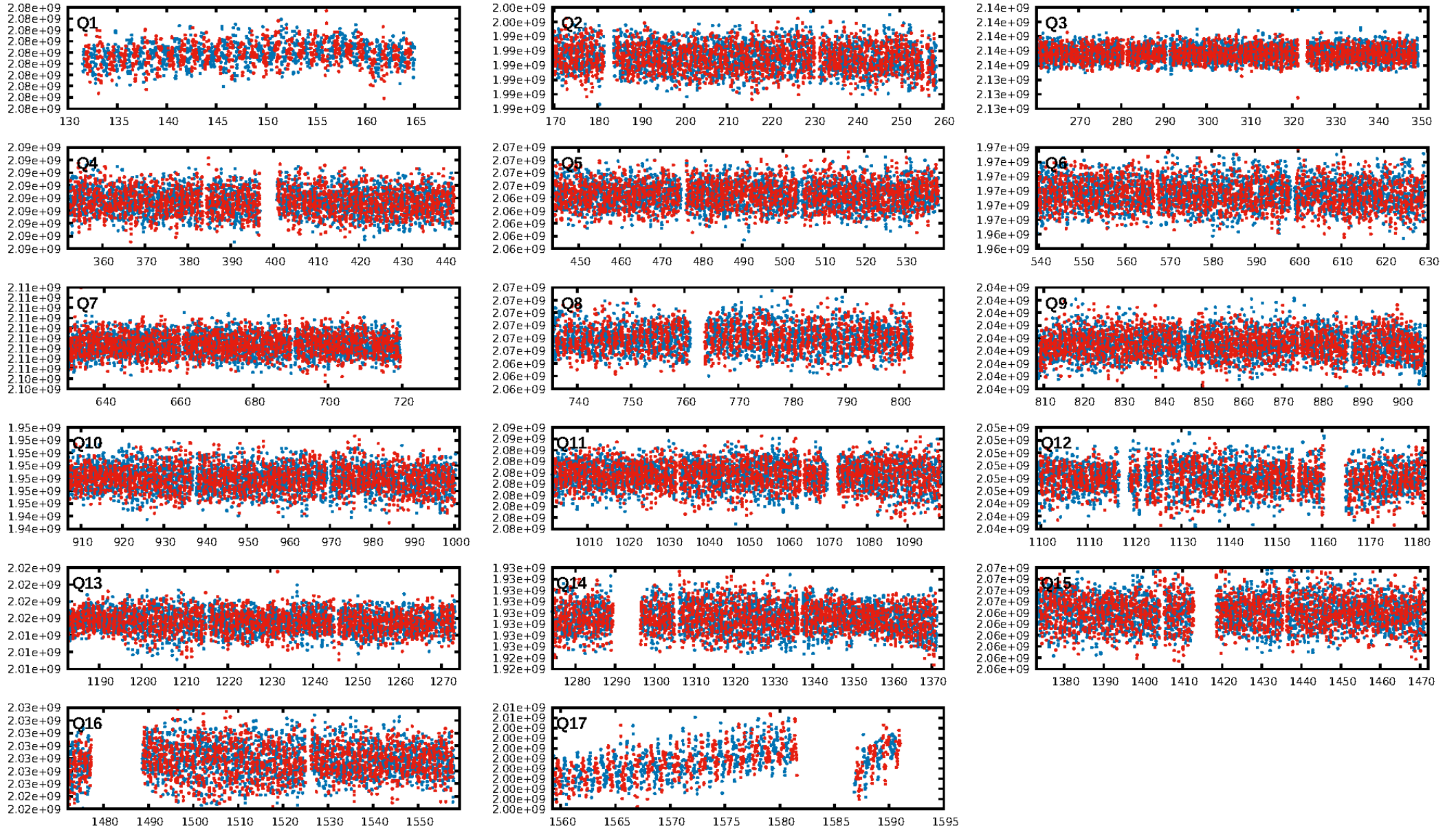
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [217.96 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.39e-12
RollingBand-fgt: 1.00 [1075/1077]
GhostDiagnostic-chr: N/A
Centroid-sig: N/A
Centroid-so: 0.520 arcsec [1.39 σ]
OotOffset-rm: 0.849 arcsec [1.22 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-rm: 1.312 arcsec [1.91 σ]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.53 [9/17]
DiffImageOverlap-fno: 1.00 [17/17]

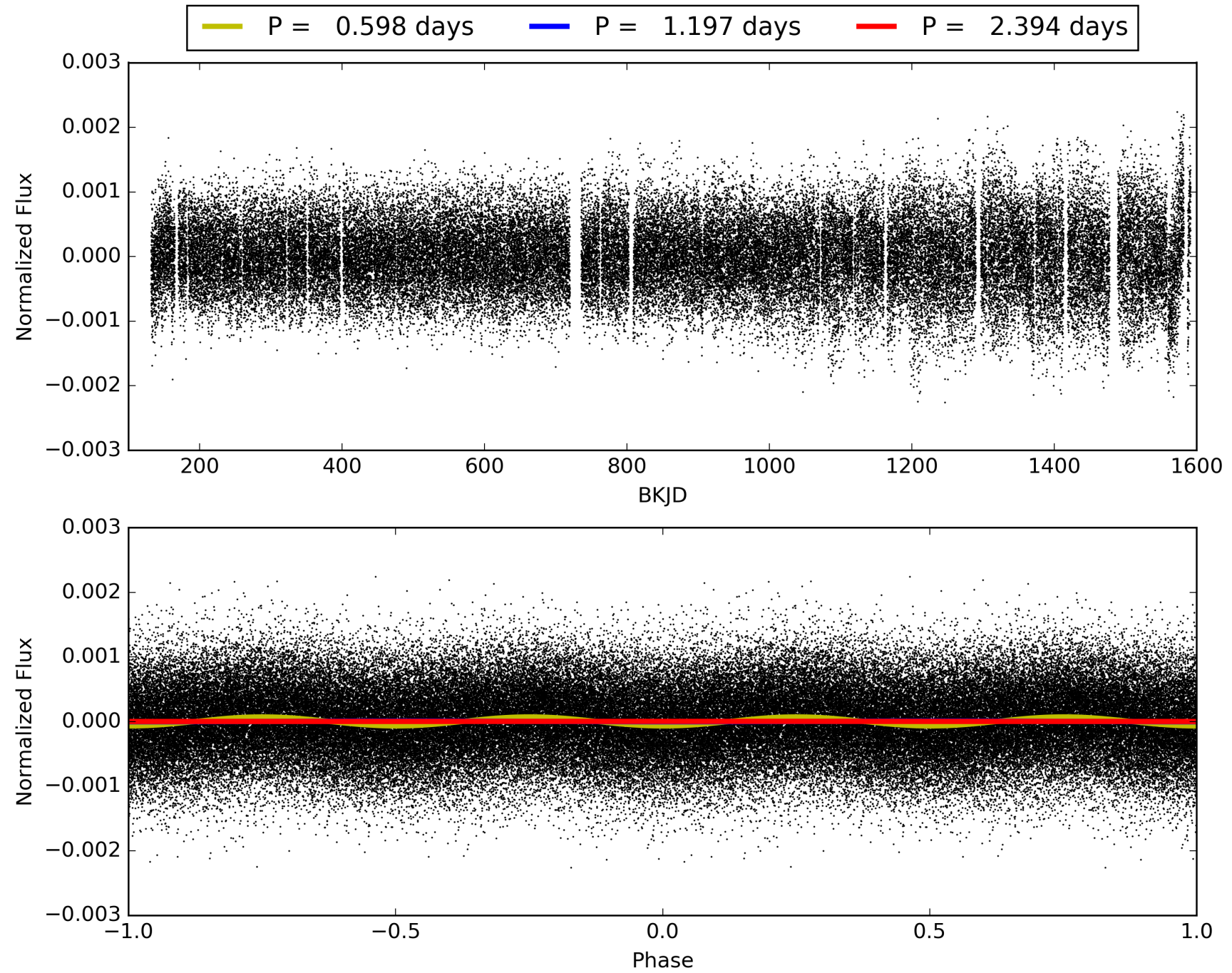
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 04:47:28 Z

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

TCE 002860851-01, PDC Light Curves

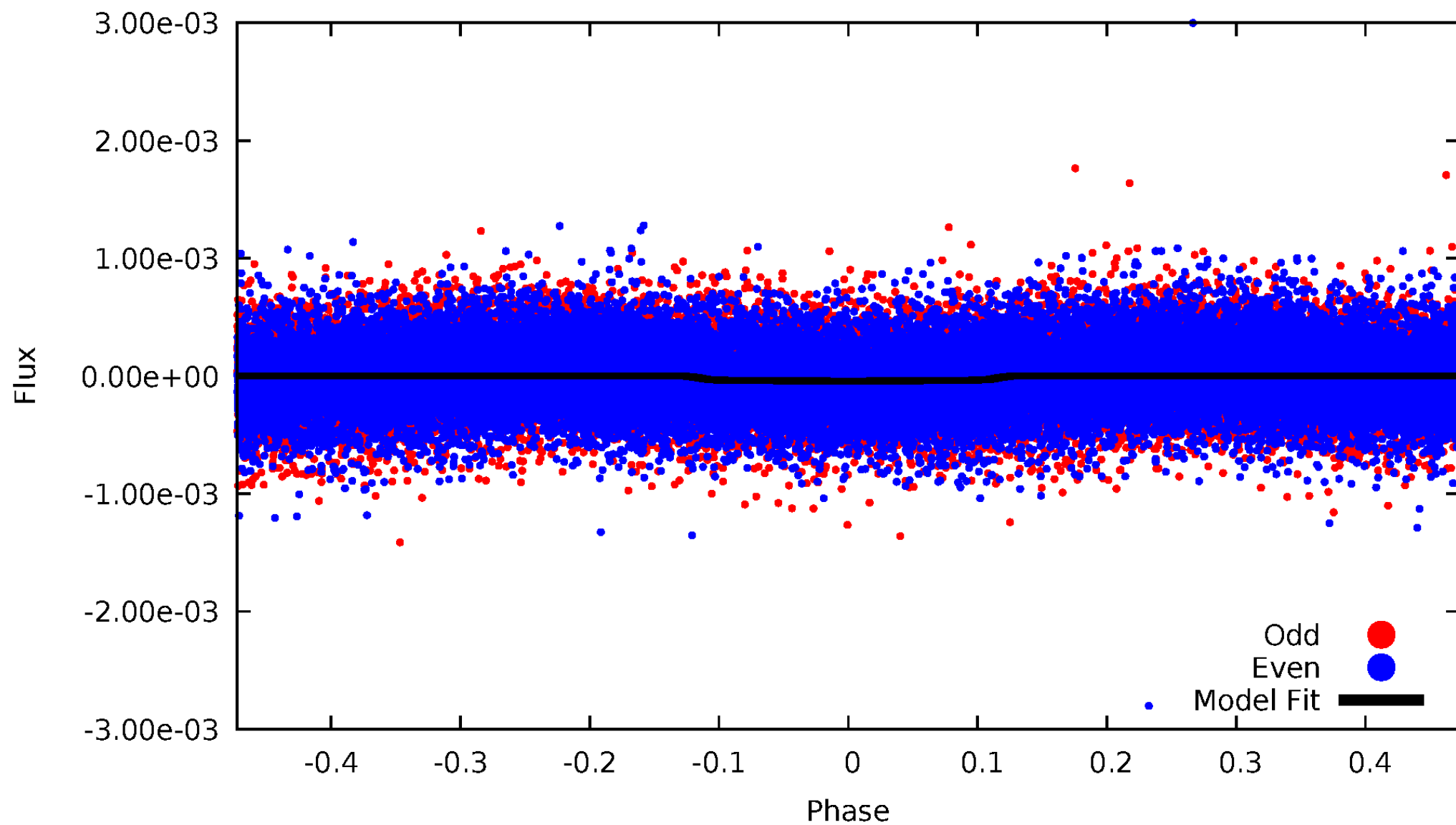


TCE 002860851-01



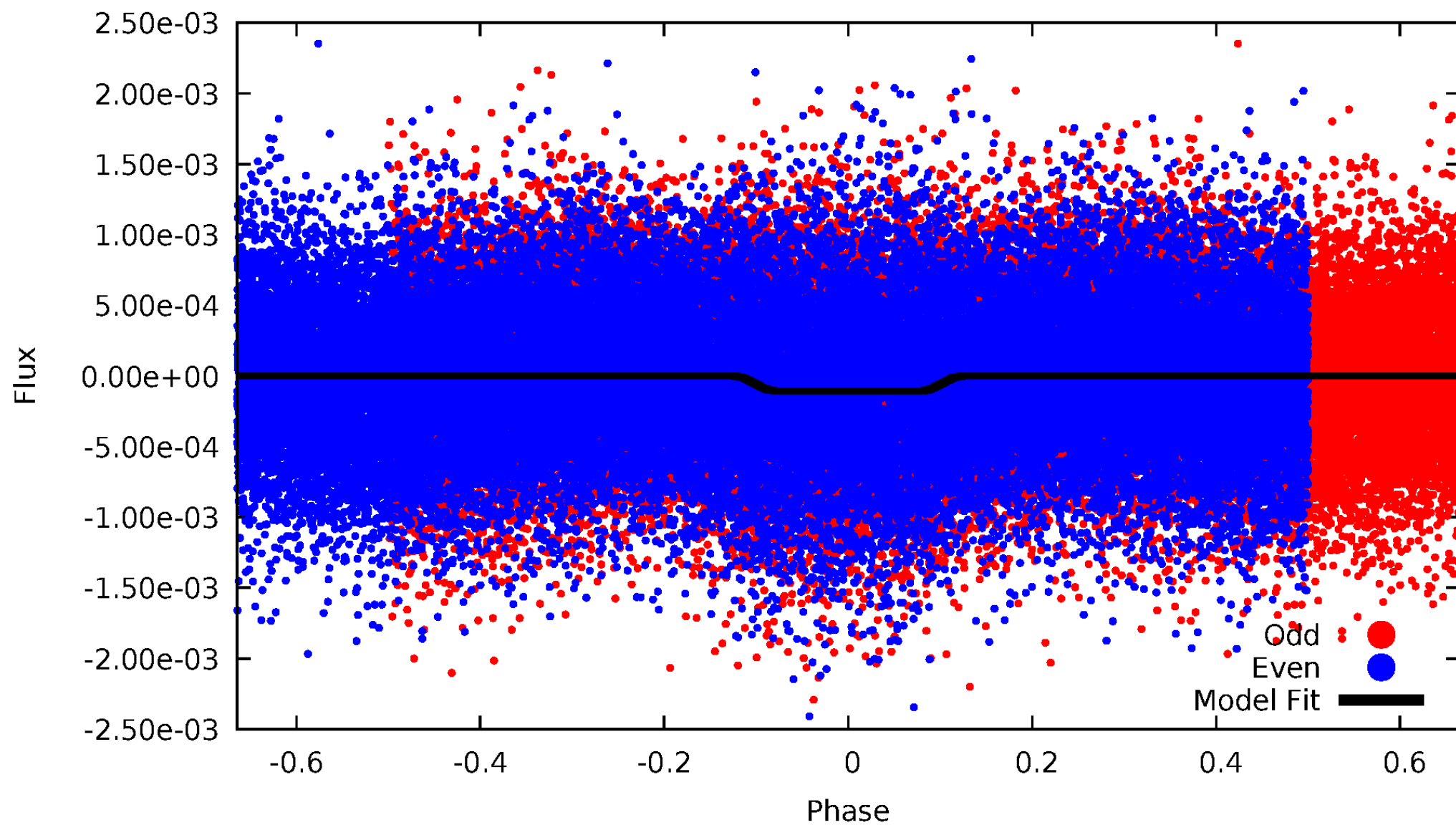
DV Odd/Even

TCE 002860851-01

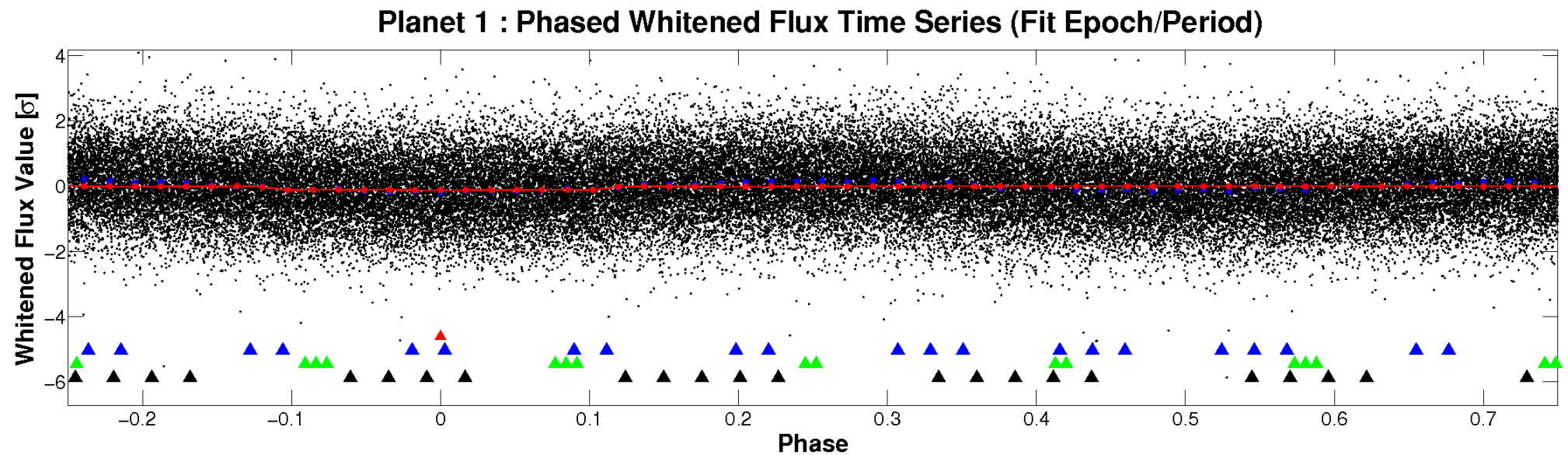
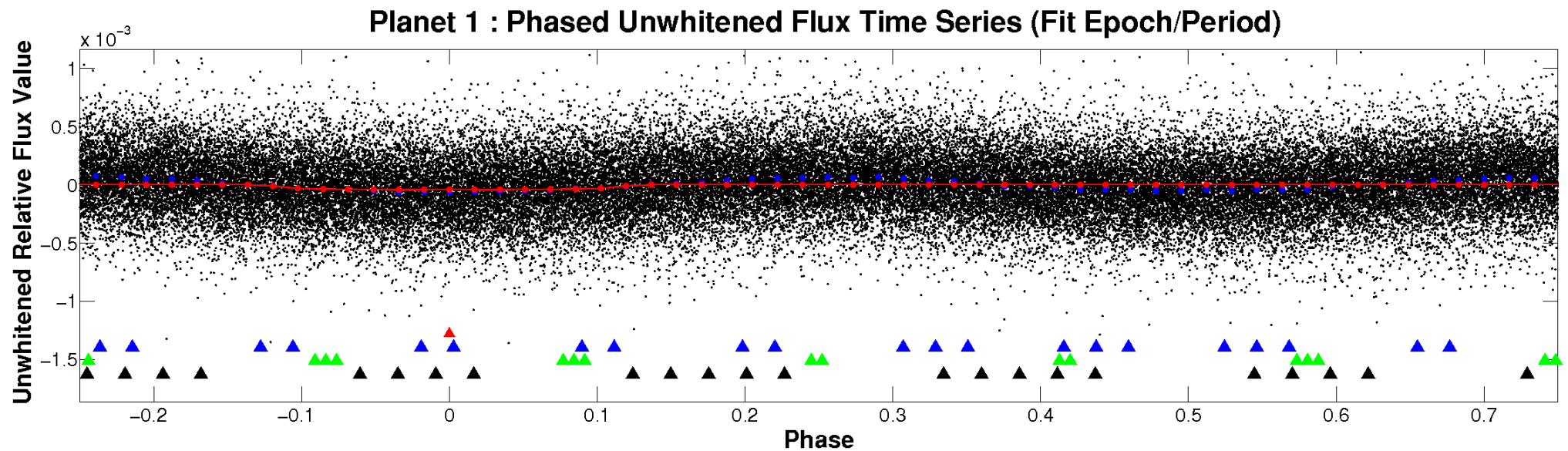


ALT Odd/Even

TCE 002860851-01

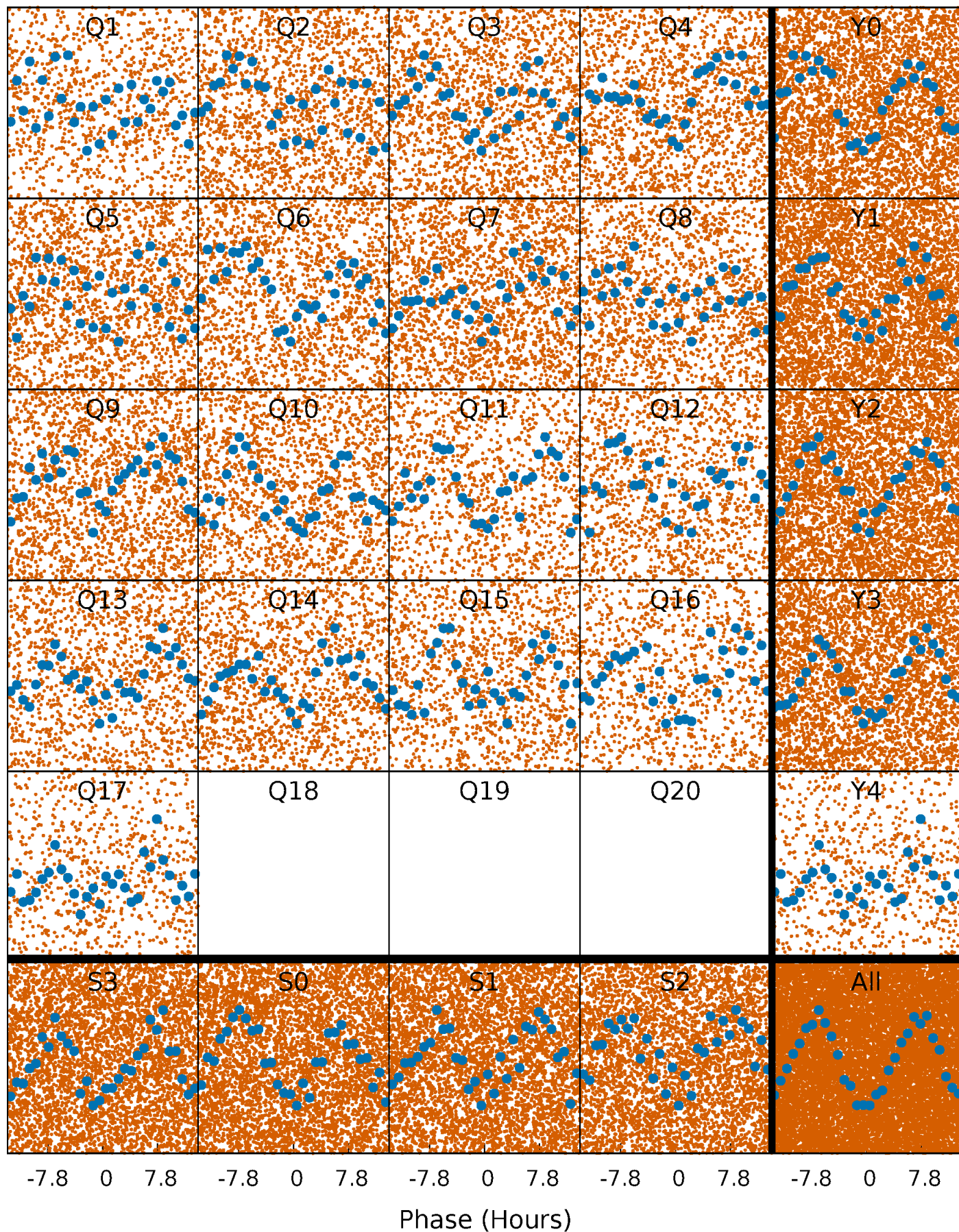


Non-Whitened Vs. Whitened Light Curve



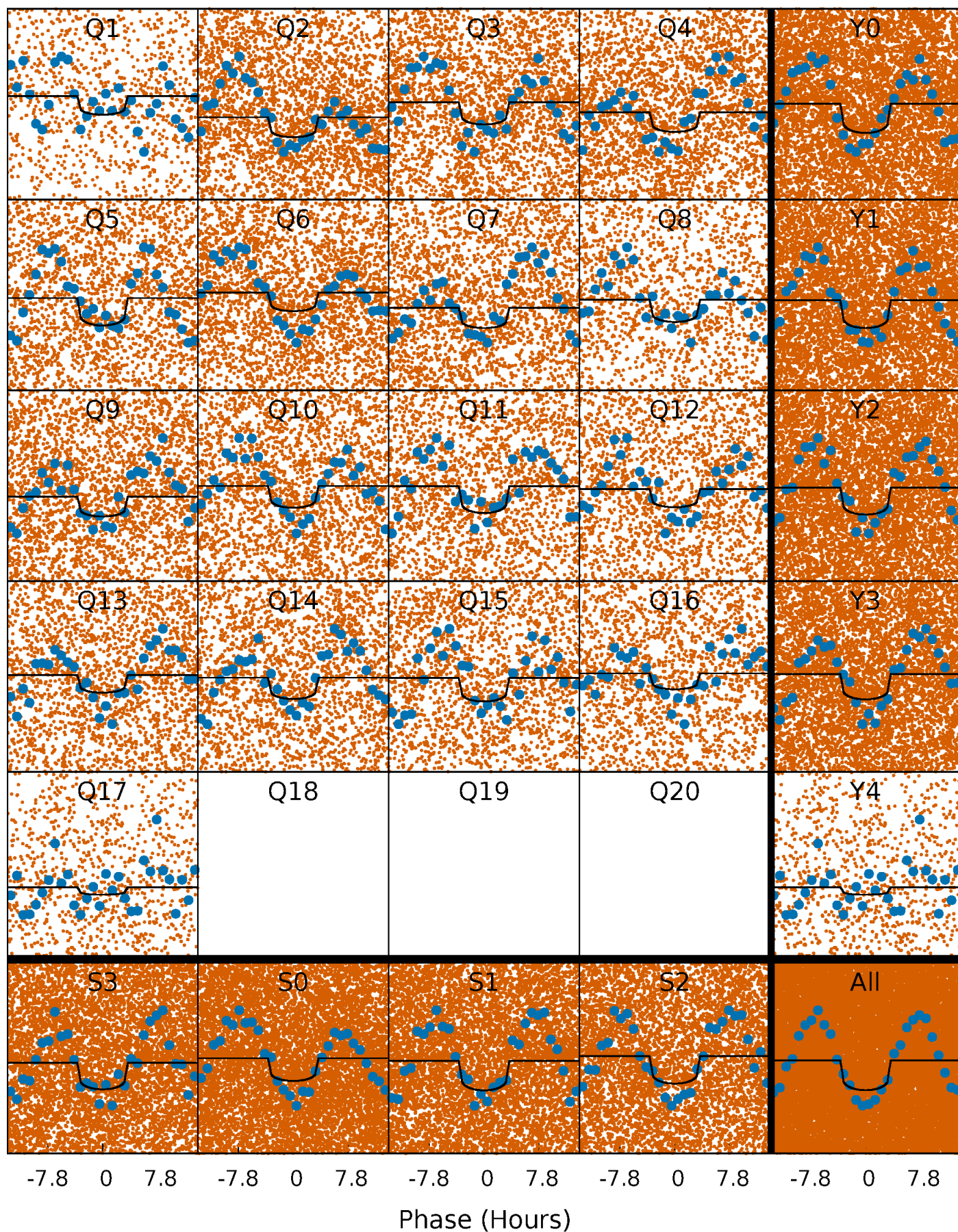
PDC Quarter-Phased Transit Curves

TCE 002860851-01 P= 1.196773 Days $T_0=132.011602$ (BKJD)



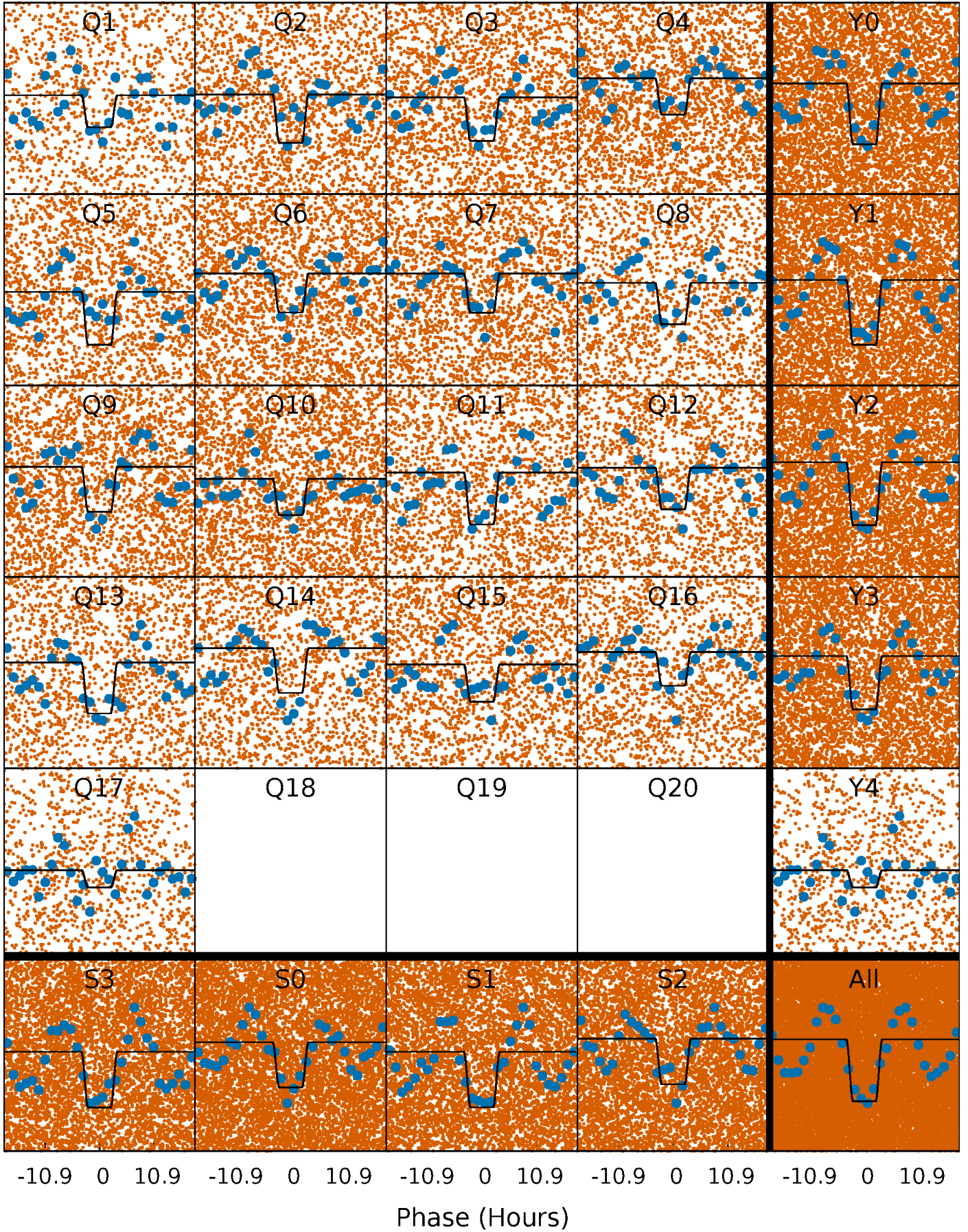
DV Quarter-Phased Transit Curves

TCE 002860851-01 P= 1.196773 Days $T_0=132.011602$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

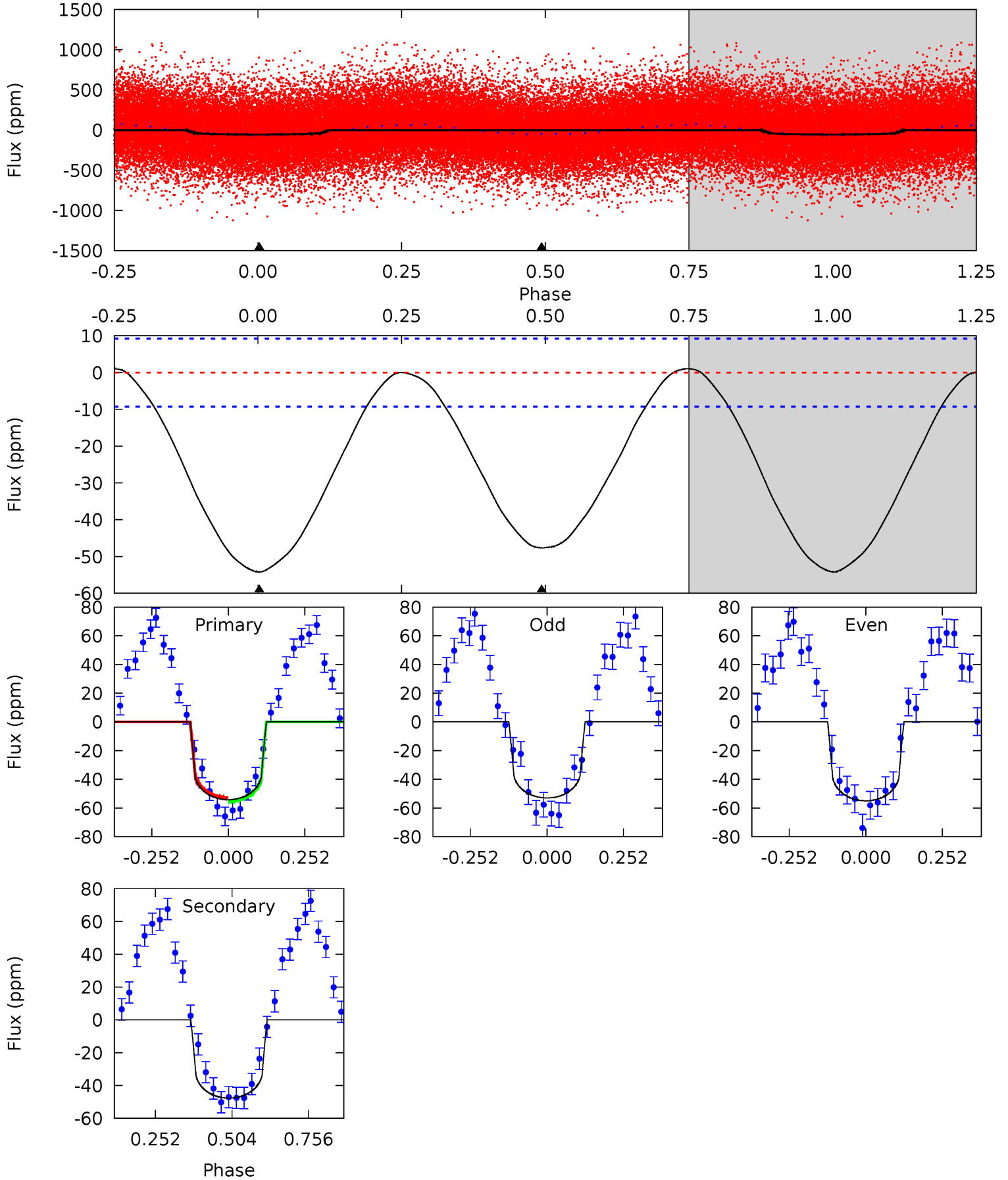
TCE 002860851-01 P= 1.196847 Days $T_0=131.969099$ (BKJD)



DV Model-Shift Uniqueness Test

002860851-01, P = 1.196773 Days, E = 130.814829 Days

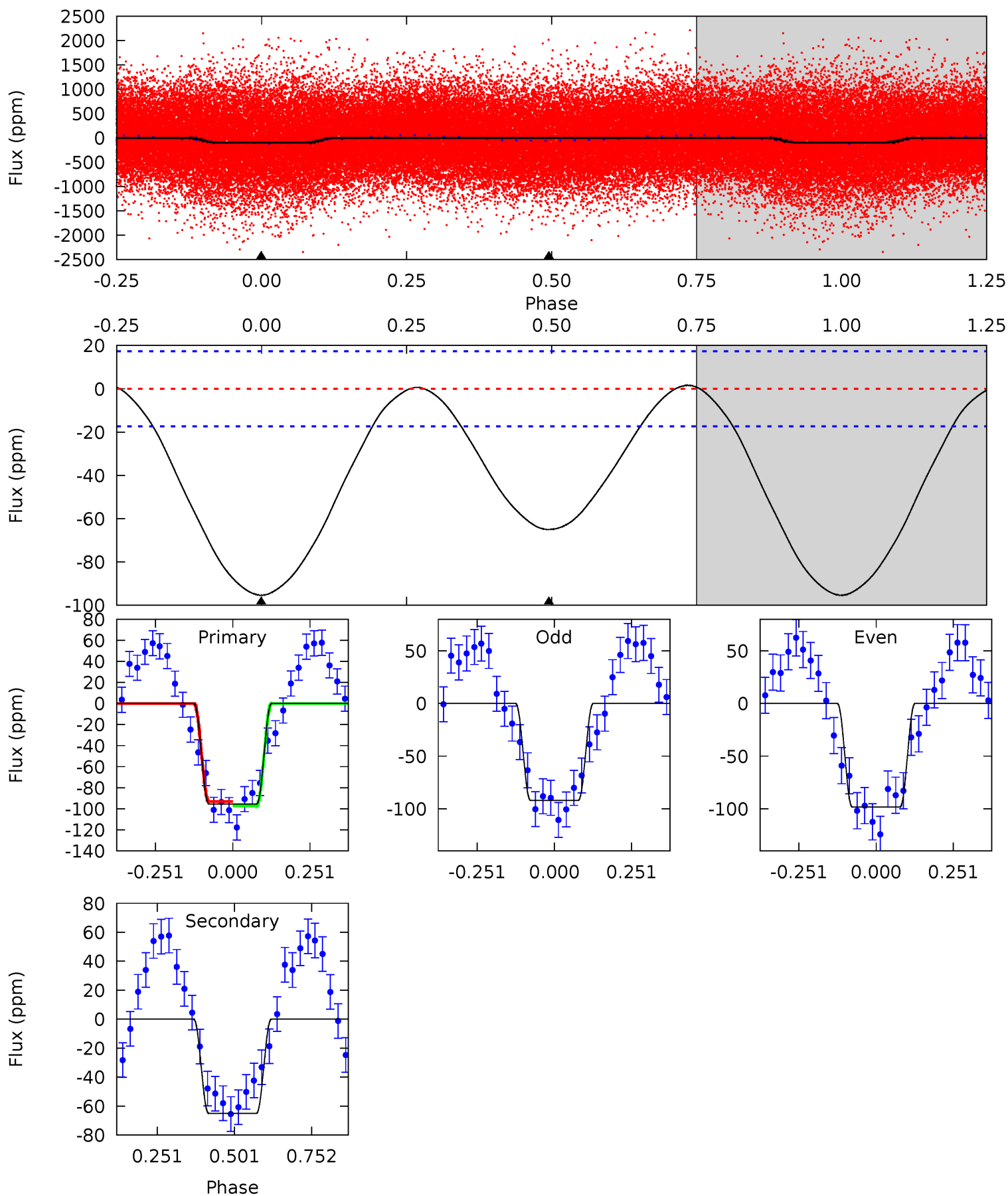
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
25.5	22.4	0	0	4.37	1.15	0.31	25.5	25.5	22.4	22.4	0.48	1.02	0.02	0.66



Alt Model-Shift Uniqueness Test

002860851-01, P = 1.196847 Days, E = 130.772252 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.1	16.4	0	0	4.37	1.15	0.50	24.1	24.1	16.4	16.4	0.80	1.16	0.02	0.49



Stellar Parameters For KIC 002860851

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	8902^{+687}_{-687}	$3.826^{+0.384}_{-0.096}$	$-0.340^{+0.150}_{-0.200}$	$2.828^{+0.505}_{-1.179}$	$1.956^{+0.374}_{-0.336}$	$0.122^{+0.392}_{-0.036}$
	+8%/-8%	+10%/-3%	+44%/-59%	+18%/-42%	+19%/-17%	+322%/-30%
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 002860851-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-48 ± 2	$1.77^{+0.98}_{-0.93}$	5409^{+530}_{-671}	9416^{+8821}_{-2178}	$6.617^{+22.710}_{-3.828}$
Alt.	-65 ± 4	$2.97^{+1.04}_{-1.02}$	5381^{+558}_{-643}	7353^{+1942}_{-1103}	$3.153^{+4.062}_{-1.426}$

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 $A_{obs} \gg 1.0$

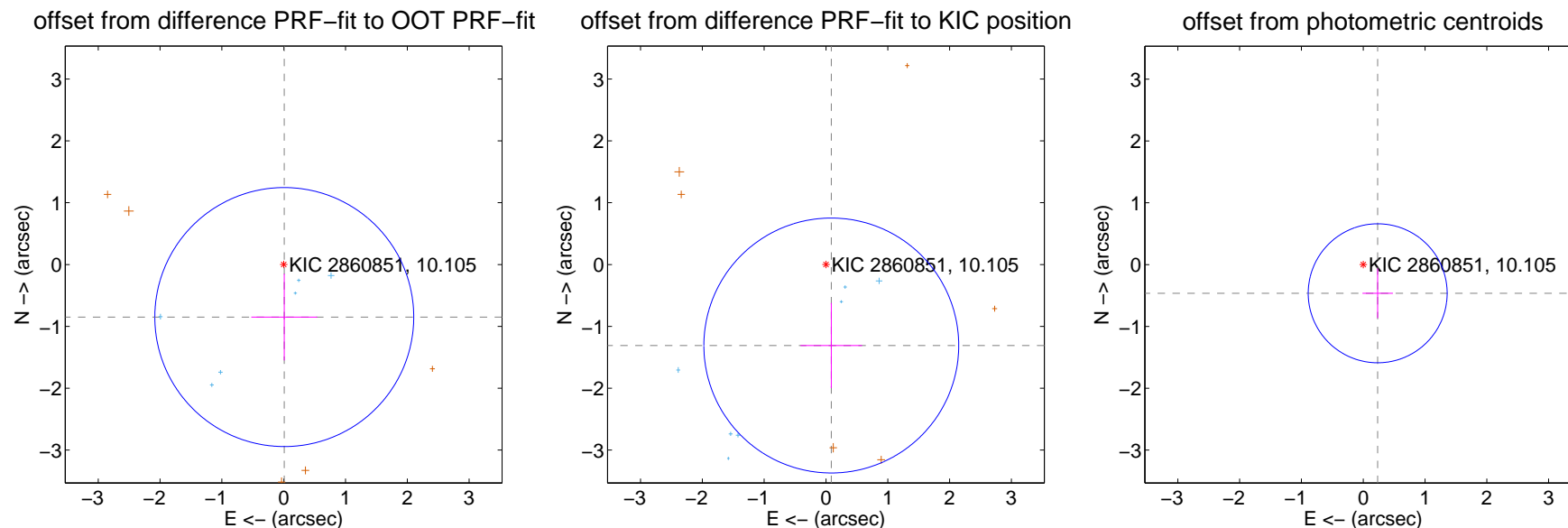
DV Centroid Data

Supplemental centroid analysis for 002860851-01. **Kepler magnitude: 10.11.** Transit SNR 13.80

There are 9 quarters with good PRF difference image offsets

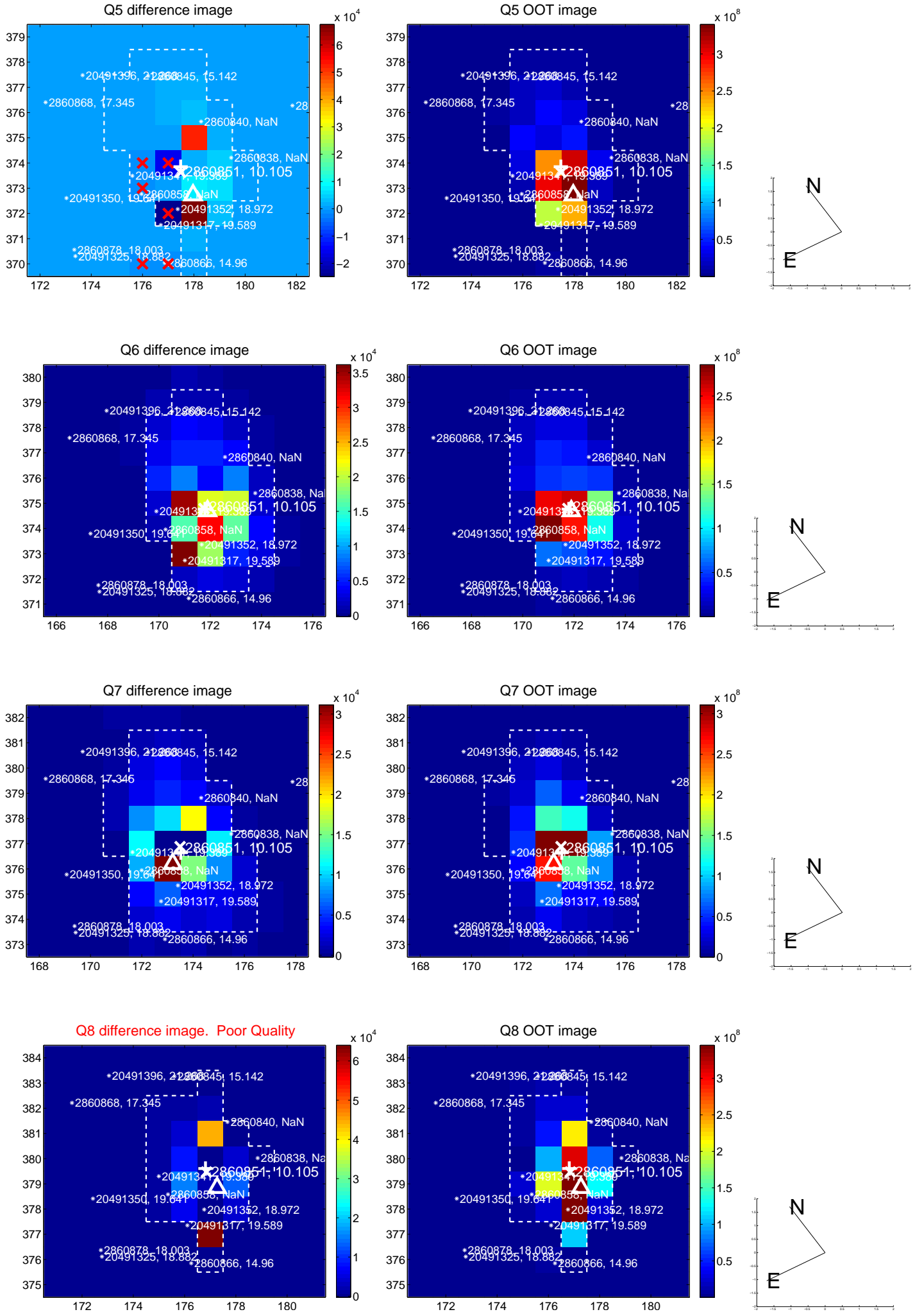
The direct PRF centroid is offset from the target star catalog position by about 0.84 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.849 ± 0.698	1.22	-0.010 ± 0.533	-0.849 ± 0.701
PRF-fit source offset from KIC position	1.312 ± 0.687	1.91	-0.086 ± 0.498	-1.309 ± 0.688
photometric centroid source offset	0.52 ± 0.37	1.39	-0.23 ± 0.25	-0.46 ± 0.40

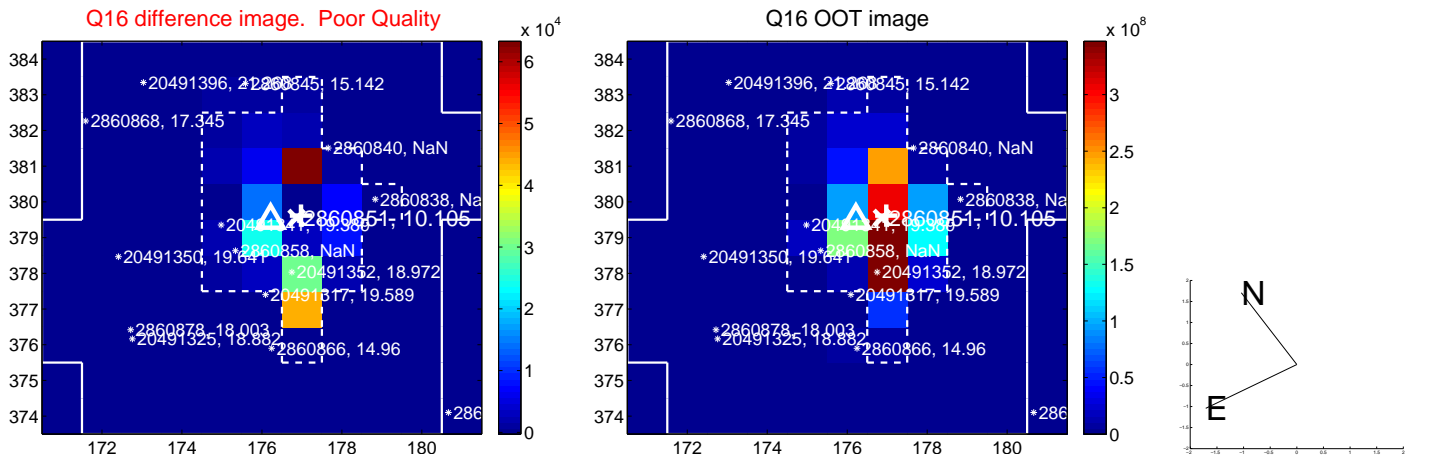
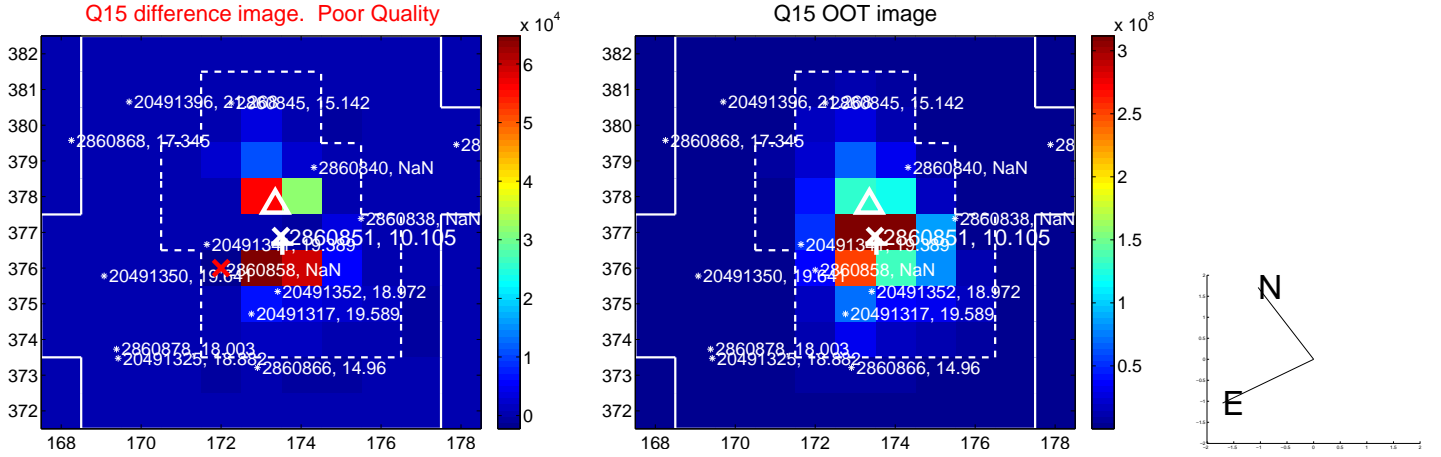
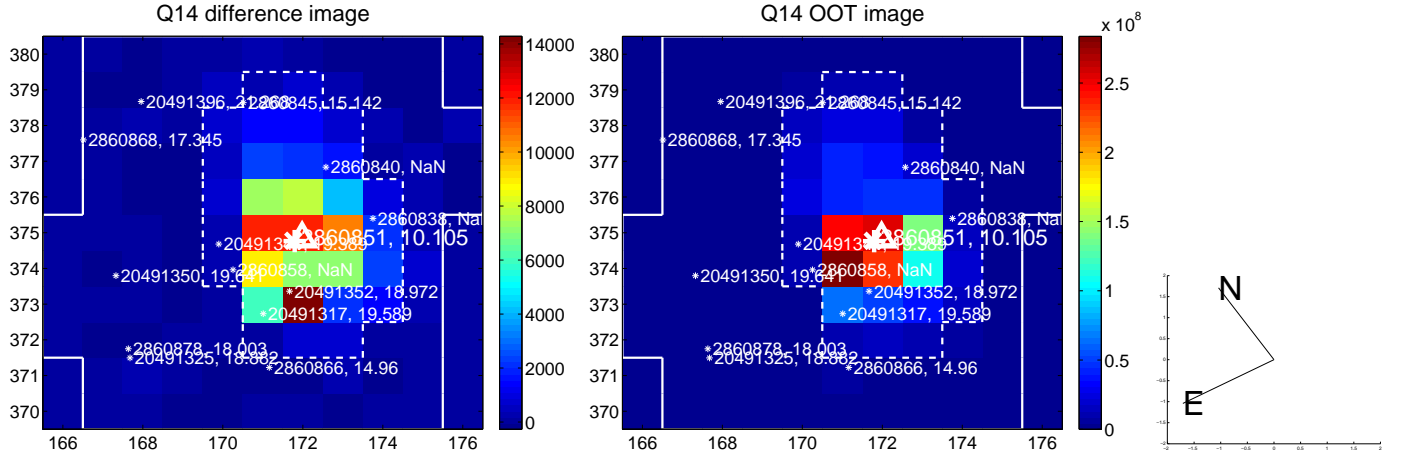
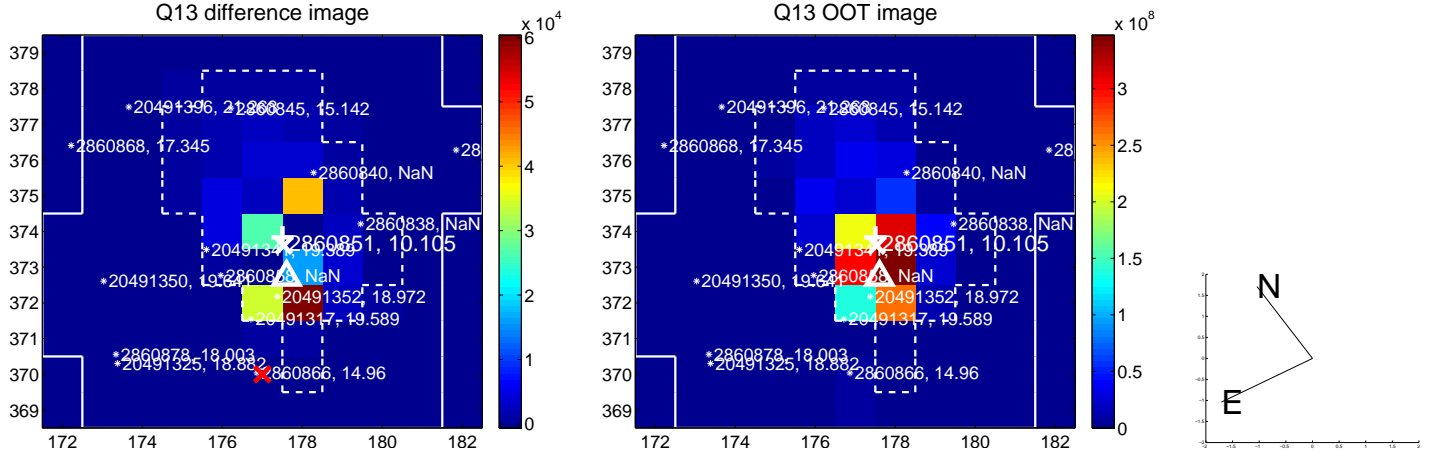


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

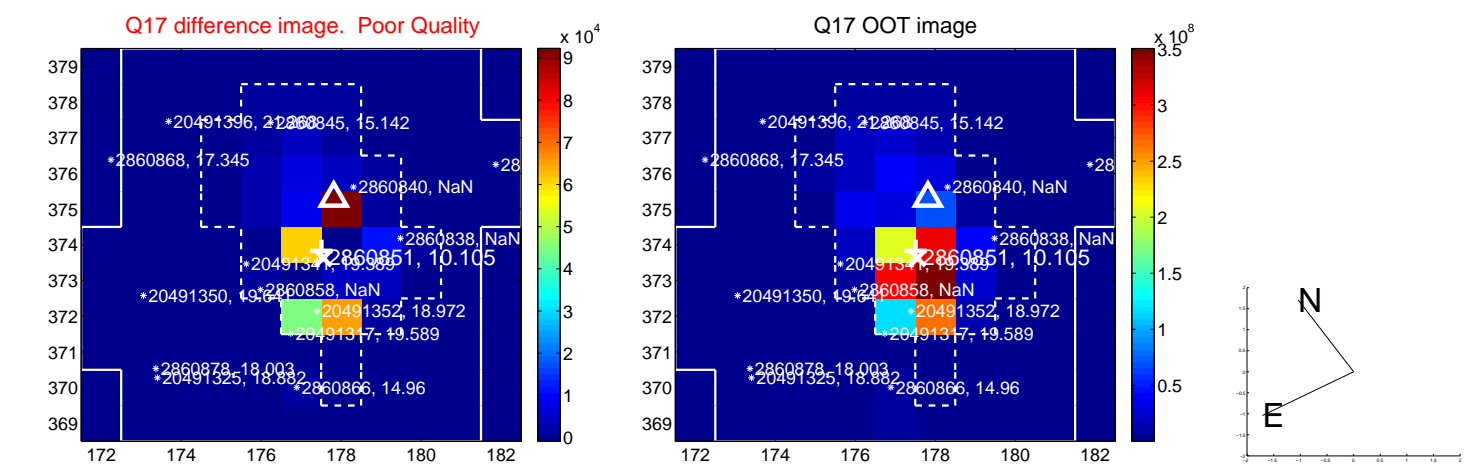
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



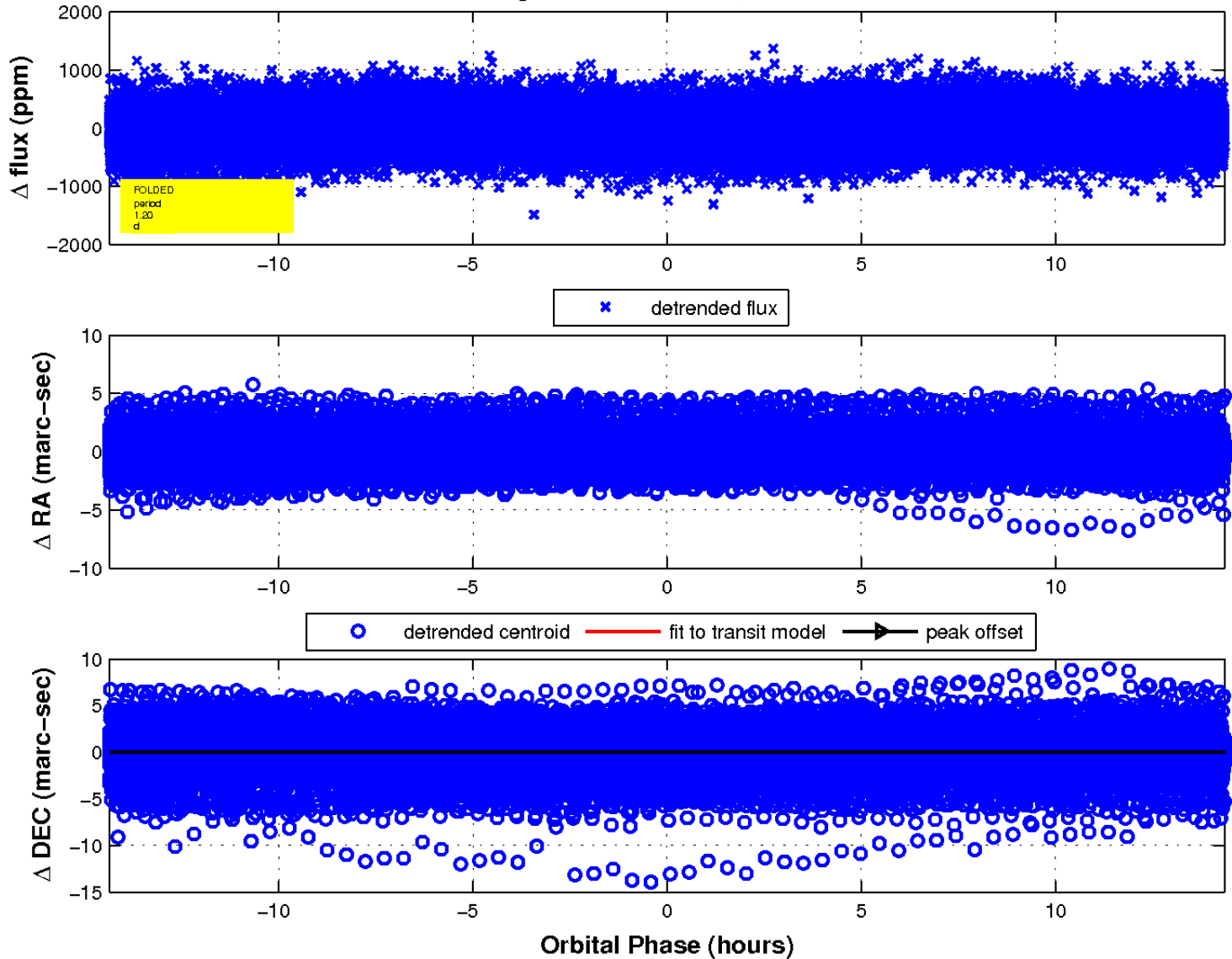
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

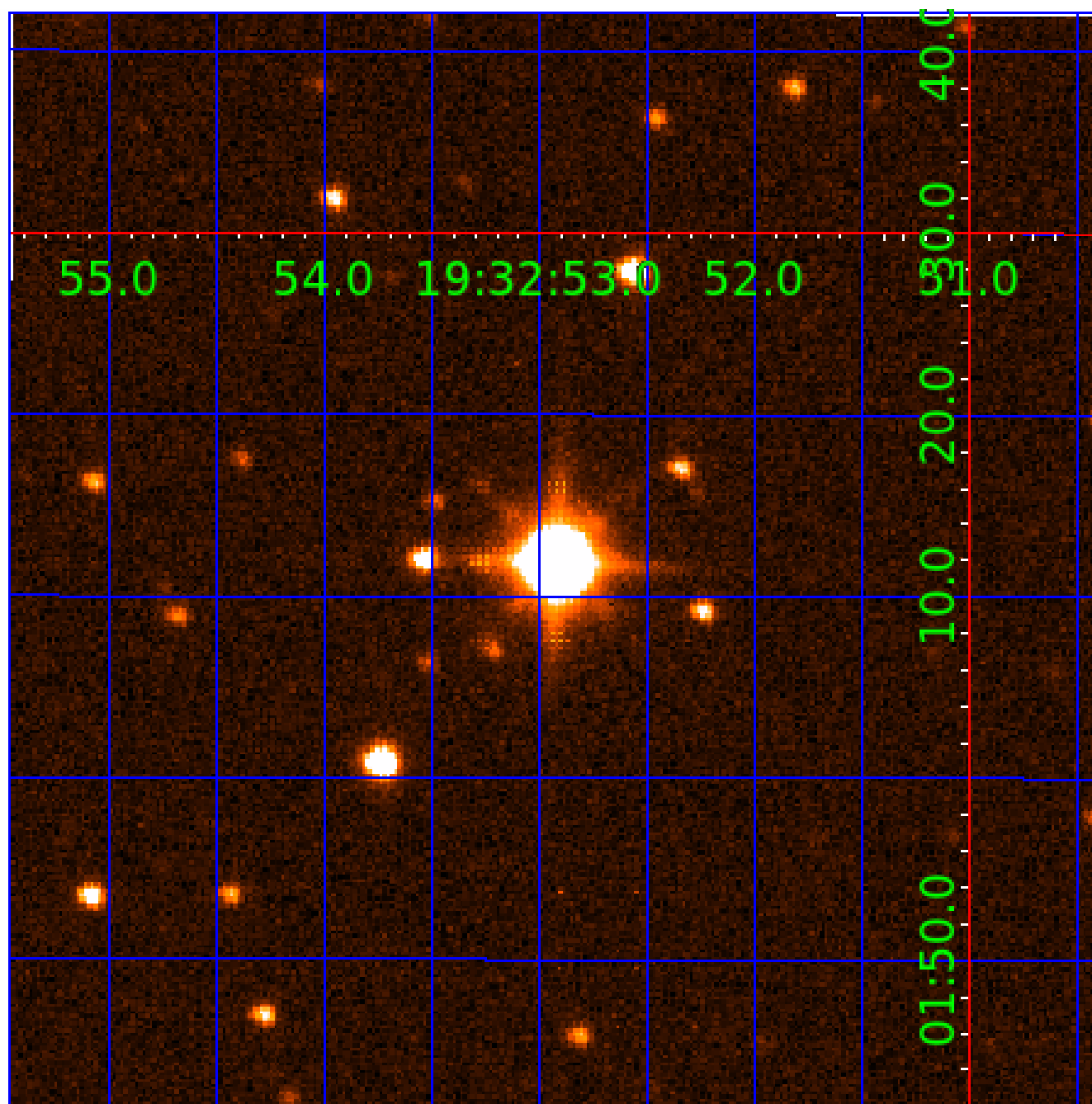


fluxWeightedCentroids, Planet 1 of 4



UKIRT Image

Declination



KIC 002860851

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})
002860851-01	OBS	No	1.196773	132.011602	42.1	6.790	11.9	13.8	2.83	8902	1.87	59131.00
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002860851-03	OBS	No	92.352446	142.271992	498.9	1.752	8.9	8.4	2.83	8902	11.89	179.98
002860851-04	OBS	No	65.098318	145.699157	361.1	1.847	9.2	9.2	2.83	8902	6.29	286.90

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002860851-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—CENT_SATURATED
002860851-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
002860851-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
002860851-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

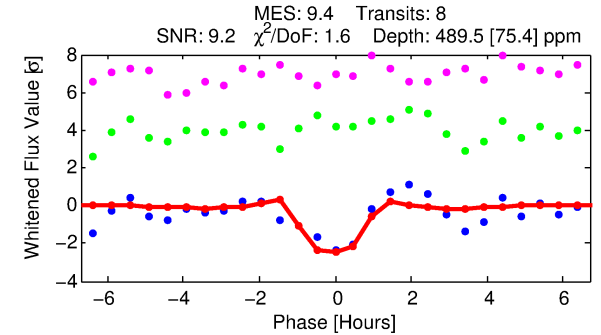
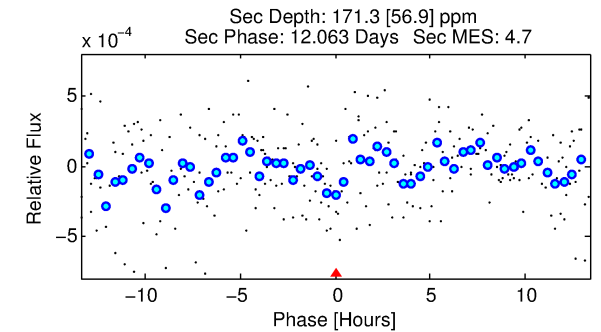
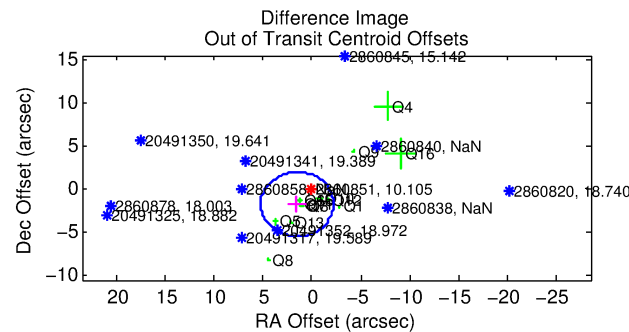
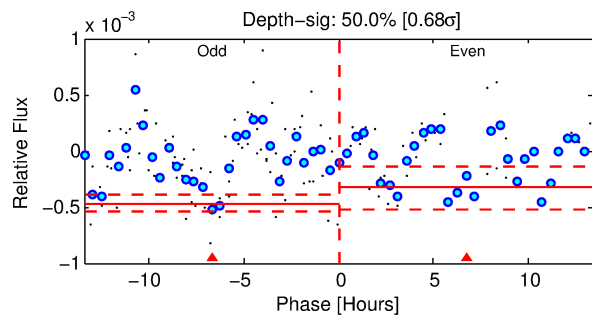
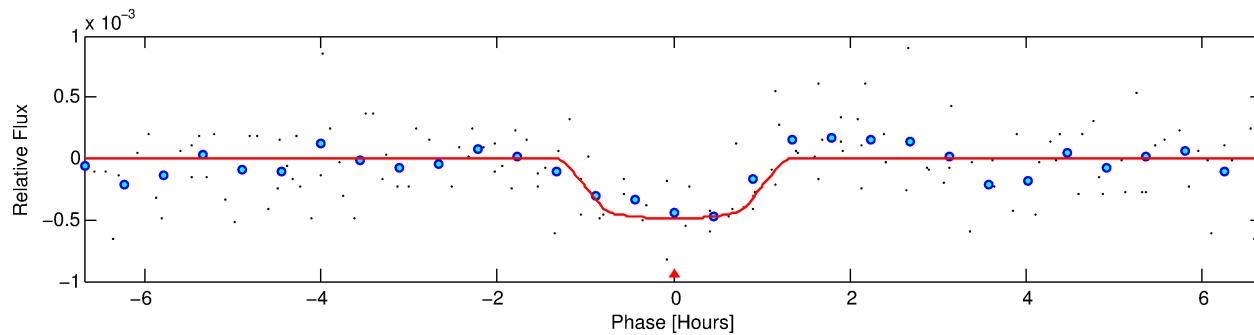
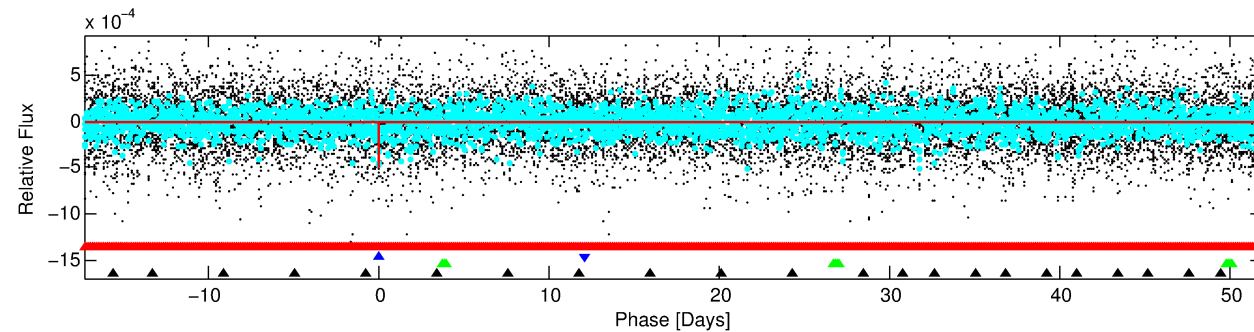
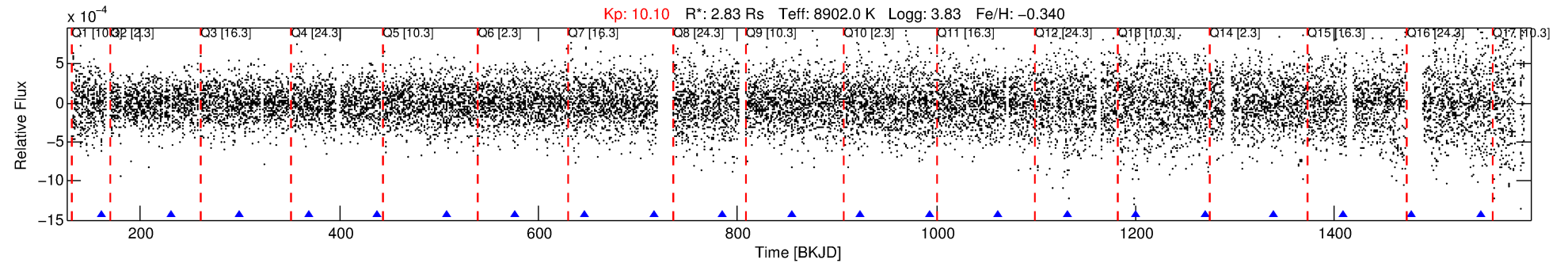
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002860851-02

No Significant Match Found

DV One-Page Summary

KIC: 2860851 Candidate: 2 of 4 Period: 69.283 d



DV Fit Results:

Period = 69.28278 [0.00053] d
Epoch = 161.3618 [0.0064] BKJD
Rp/R* = 0.0226 [0.0239]
a/R* = 140.72 [1001.72]
b = 0.83 [2.64]
Seff = 264.04 [190.40]
Teff = 1028 [185] K
Rp = 6.99 [7.93] Re
a = 0.4128 [0.1672] AU
Ag = 328.86 [734.85] [0.45 σ]
Teffp = 6768 [3654] K [1.57 σ]

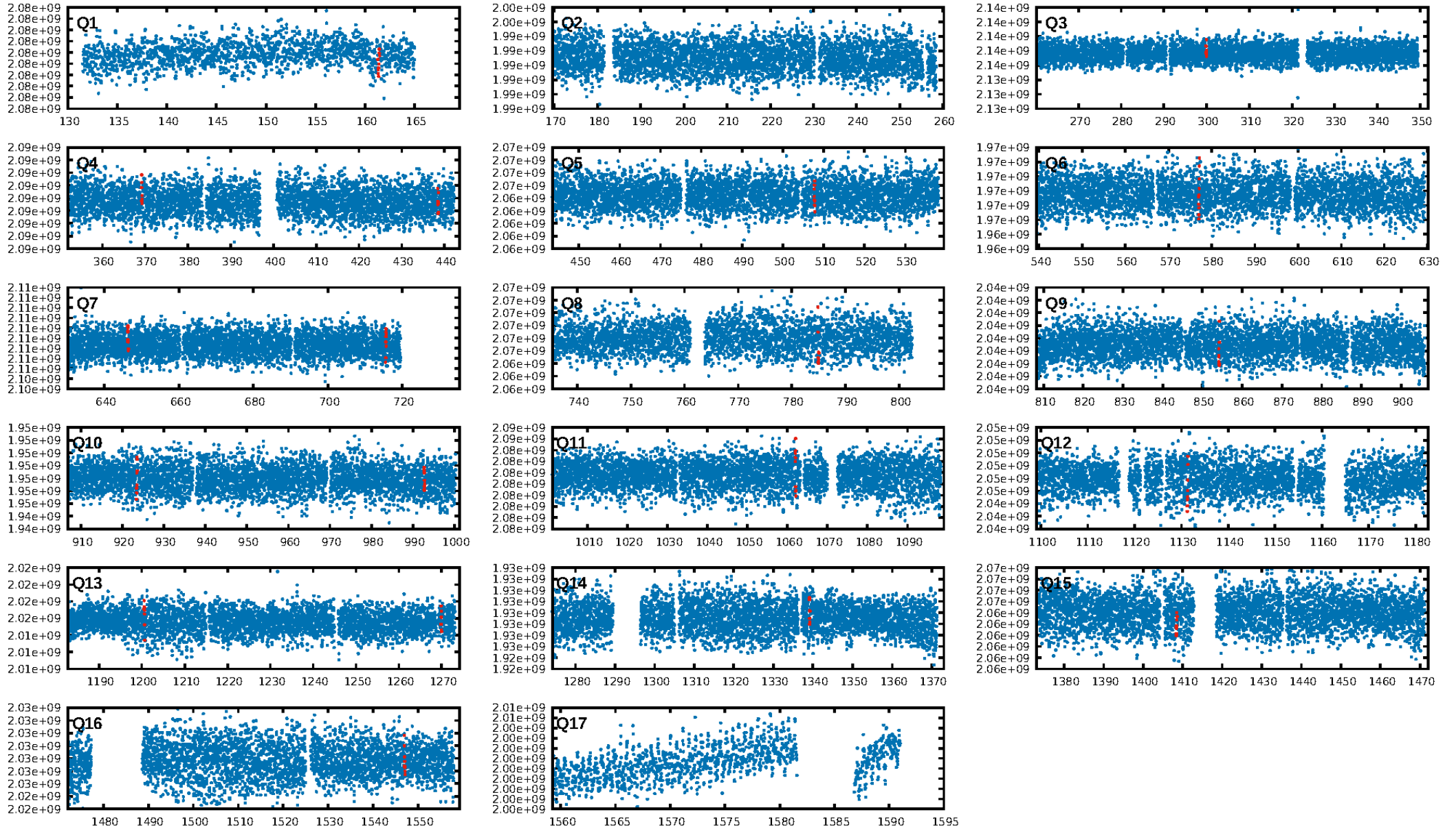
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [34.68 σ]
LongPeriod-sig: 100.0% [195.26 σ]
ModelChiSquare2-sig: 3.1%
ModelChiSquareGof-sig: 99.5%
Bootstrap-pfa: 8.37e-10
RollingBand-fgt: 1.00 [7/7]
GhostDiagnostic-chr: N/A
Centroid-sig: N/A
Centroid-so: 0.547 arcsec [1.44 σ]
OotOffset-rm: 2.307 arcsec [1.87 σ]
KicOffset-rm: 2.888 arcsec [2.00 σ]
OotOffset-st: 2/4/4/4 [14]
KicOffset-st: 2/4/4/4 [14]
DiffImageQuality-fgm: 0.21 [3/14]
DiffImageOverlap-fno: 0.33 [5/15]

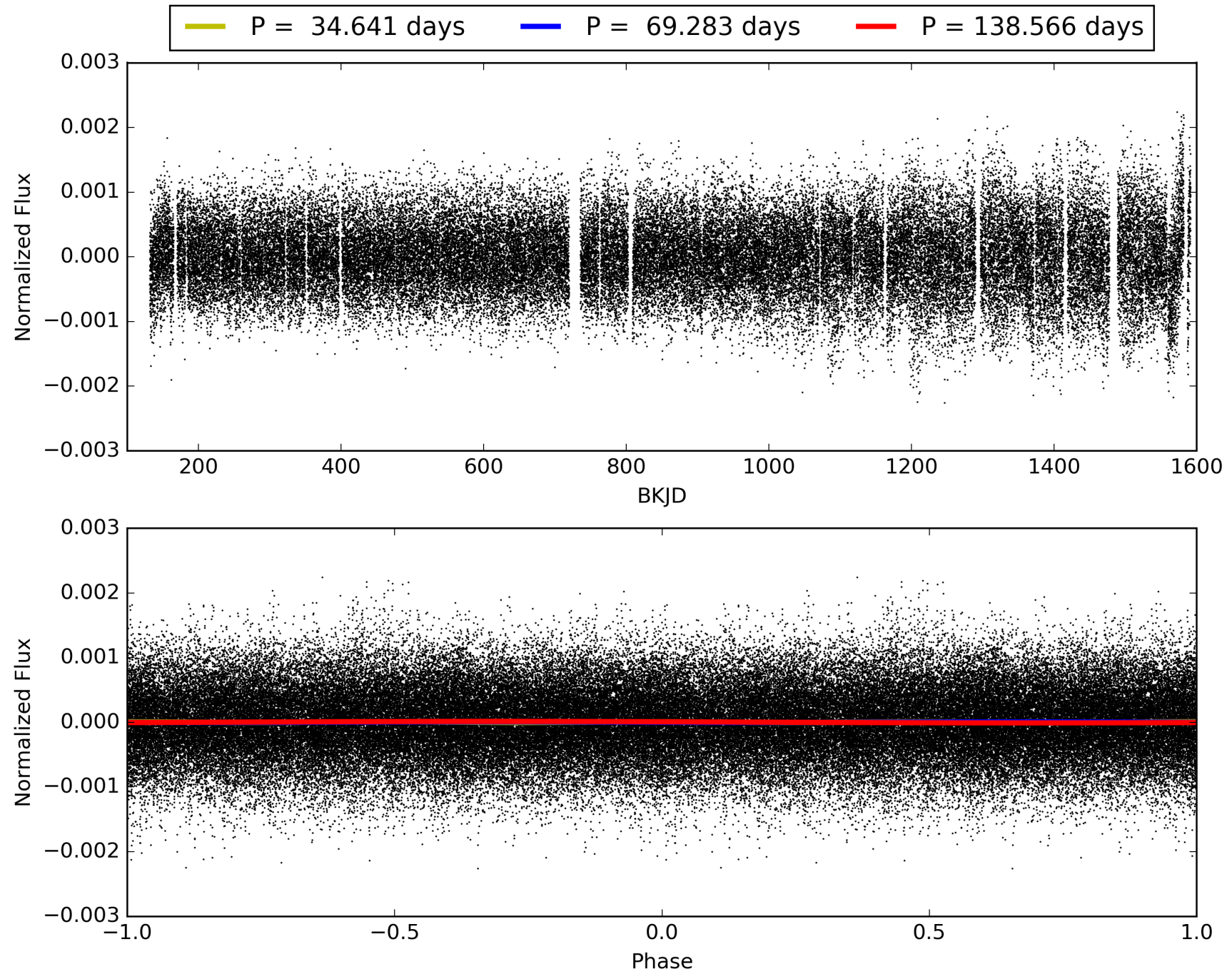
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 04:47:40 Z

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

TCE 002860851-02, PDC Light Curves

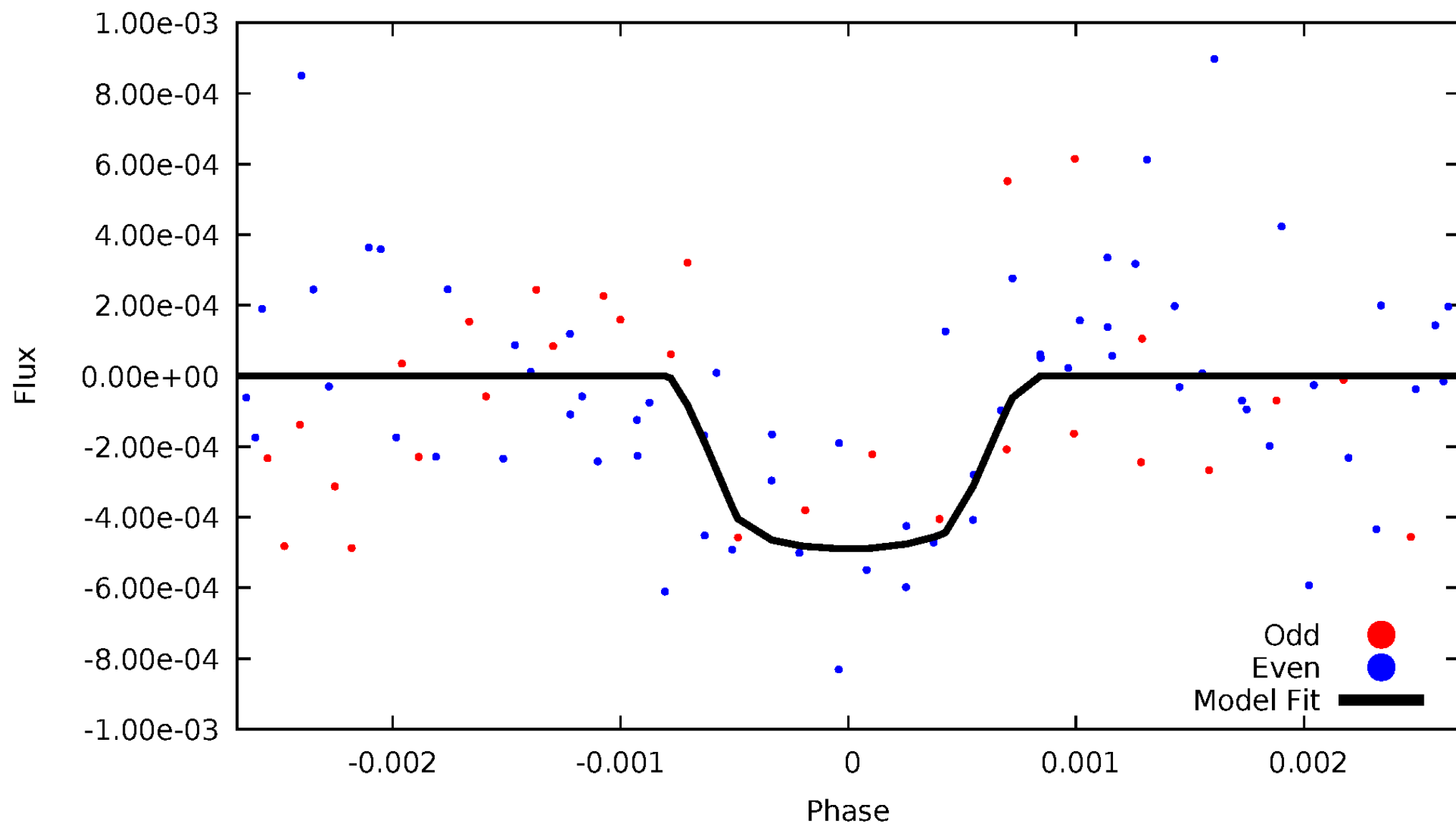


TCE 002860851-02



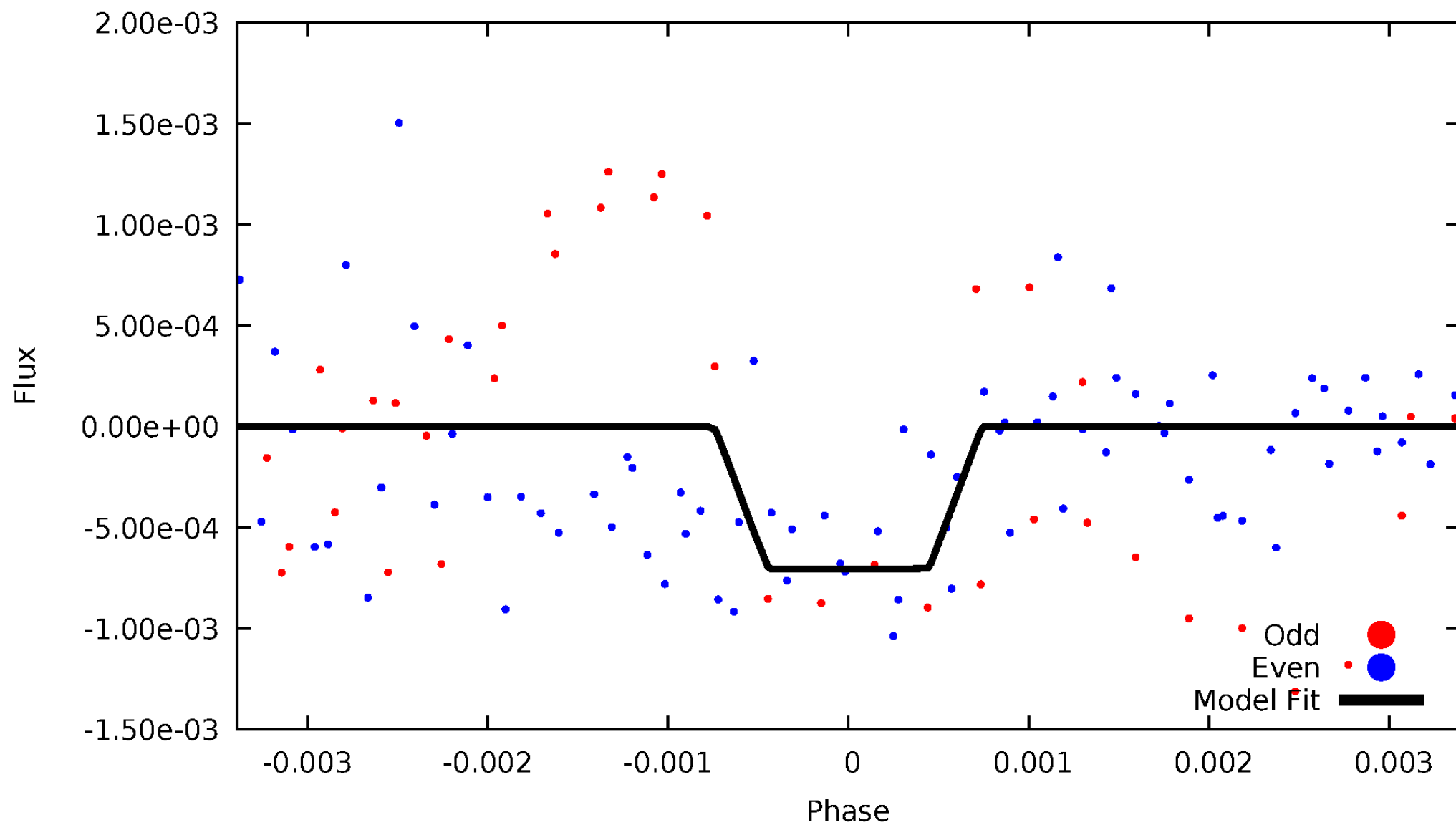
DV Odd/Even

TCE 002860851-02



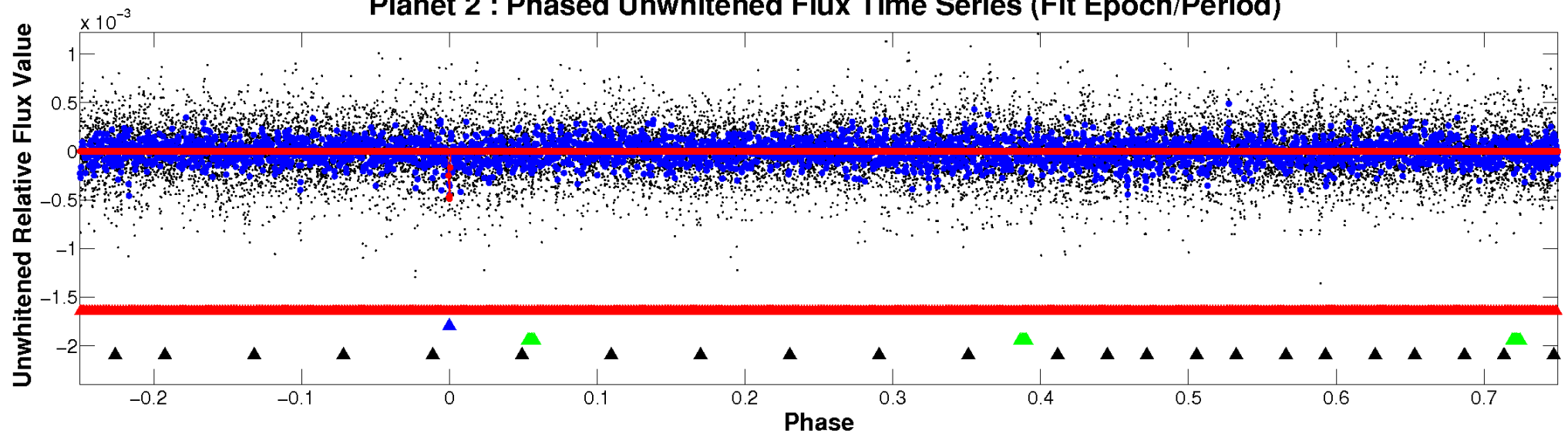
ALT Odd/Even

TCE 002860851-02

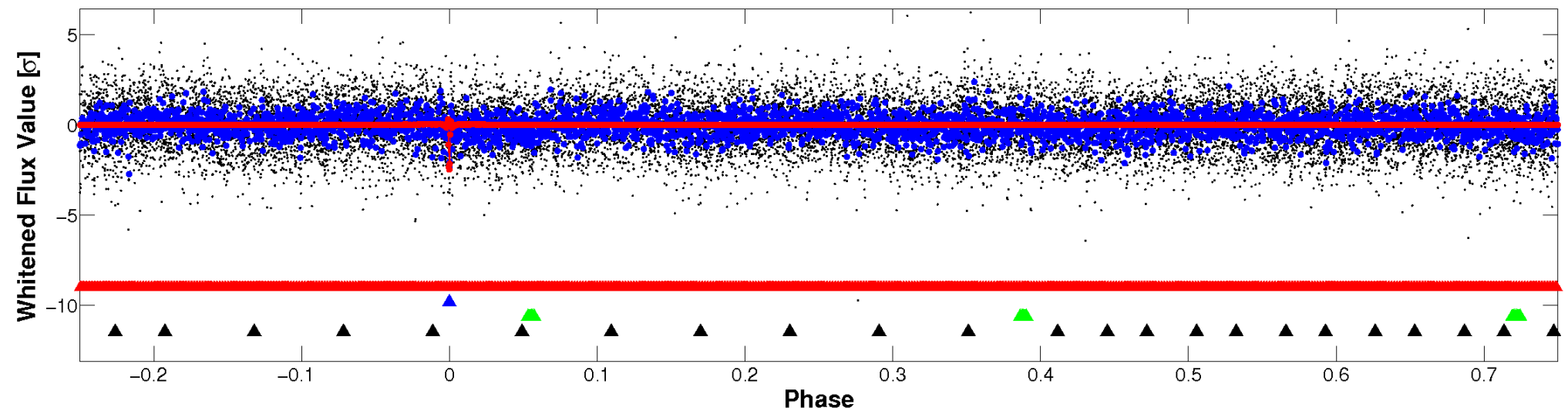


Non-Whitened Vs. Whitened Light Curve

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

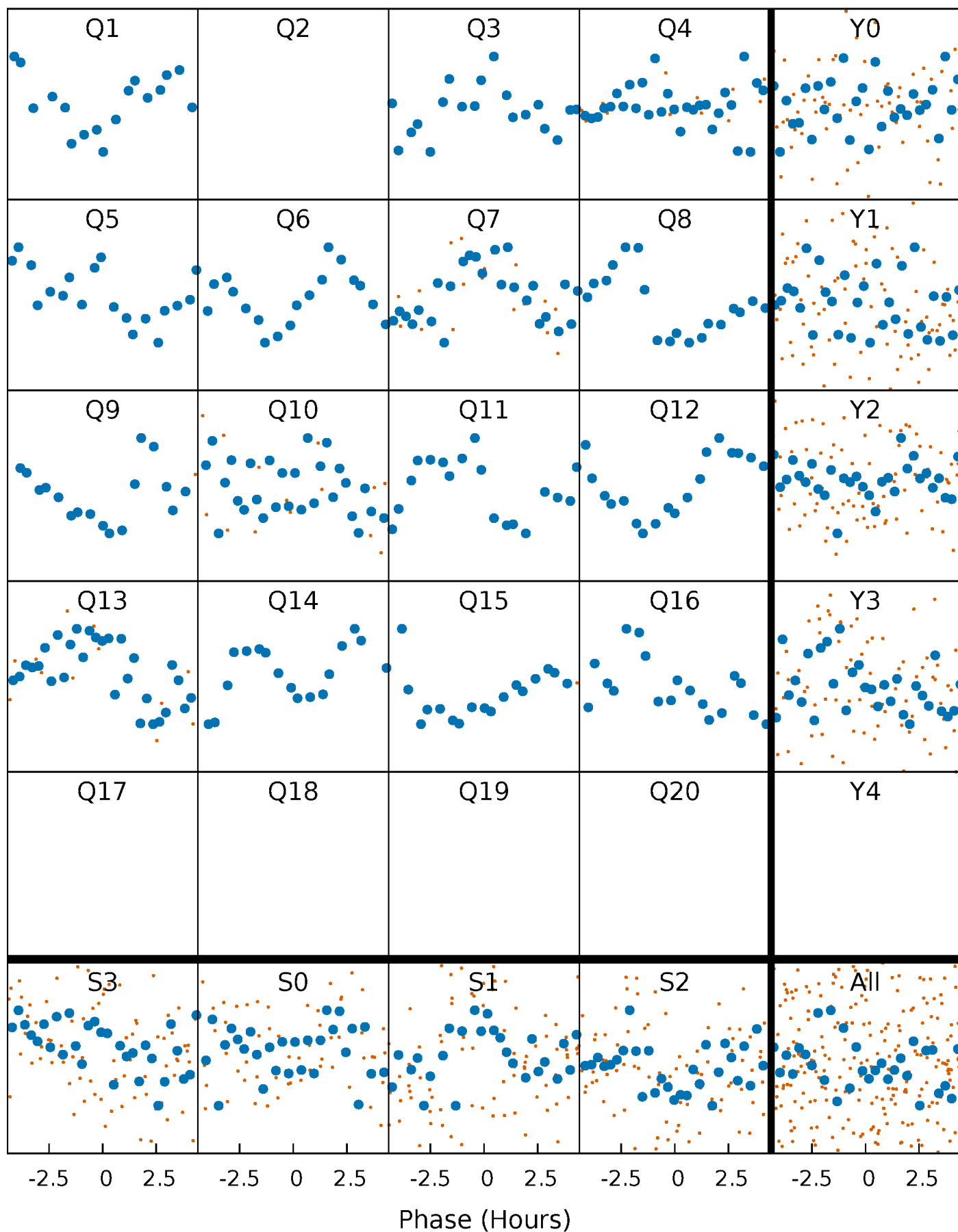


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



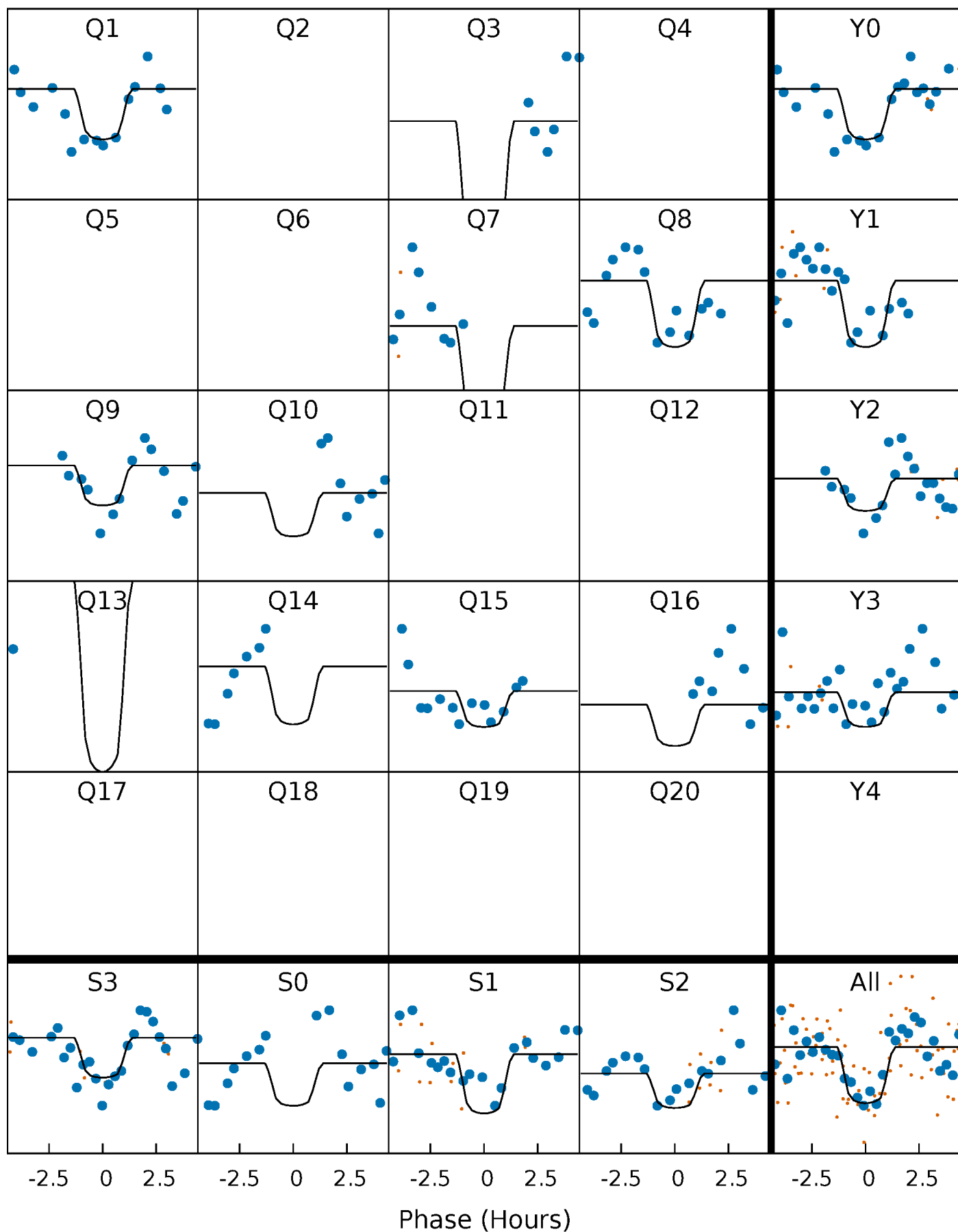
PDC Quarter-Phased Transit Curves

TCE 002860851-02 P= 69.282777 Days $T_0=161.361756$ (BKJD)



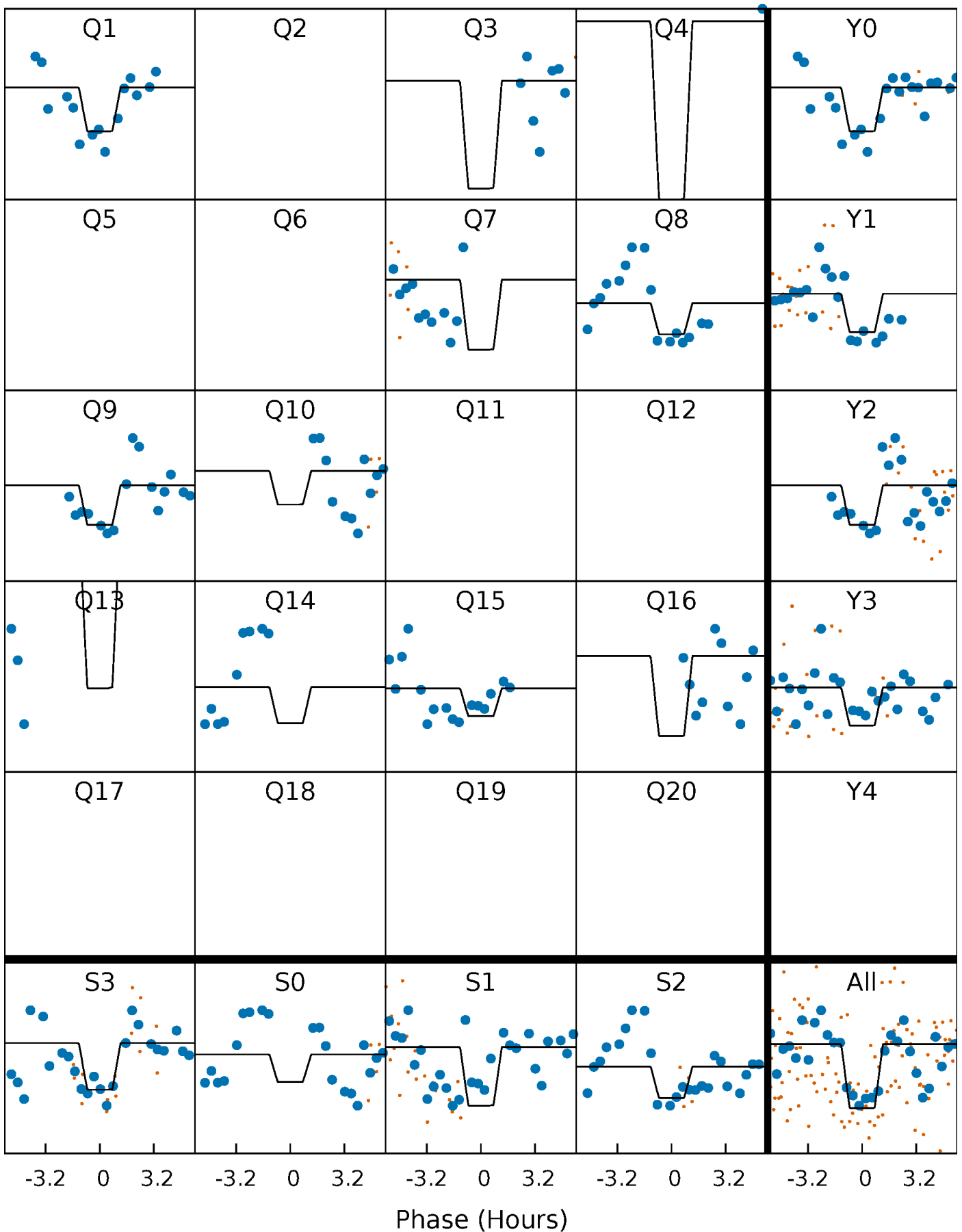
DV Quarter-Phased Transit Curves

TCE 002860851-02 $P = 69.282777$ Days $T_0 = 161.361756$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

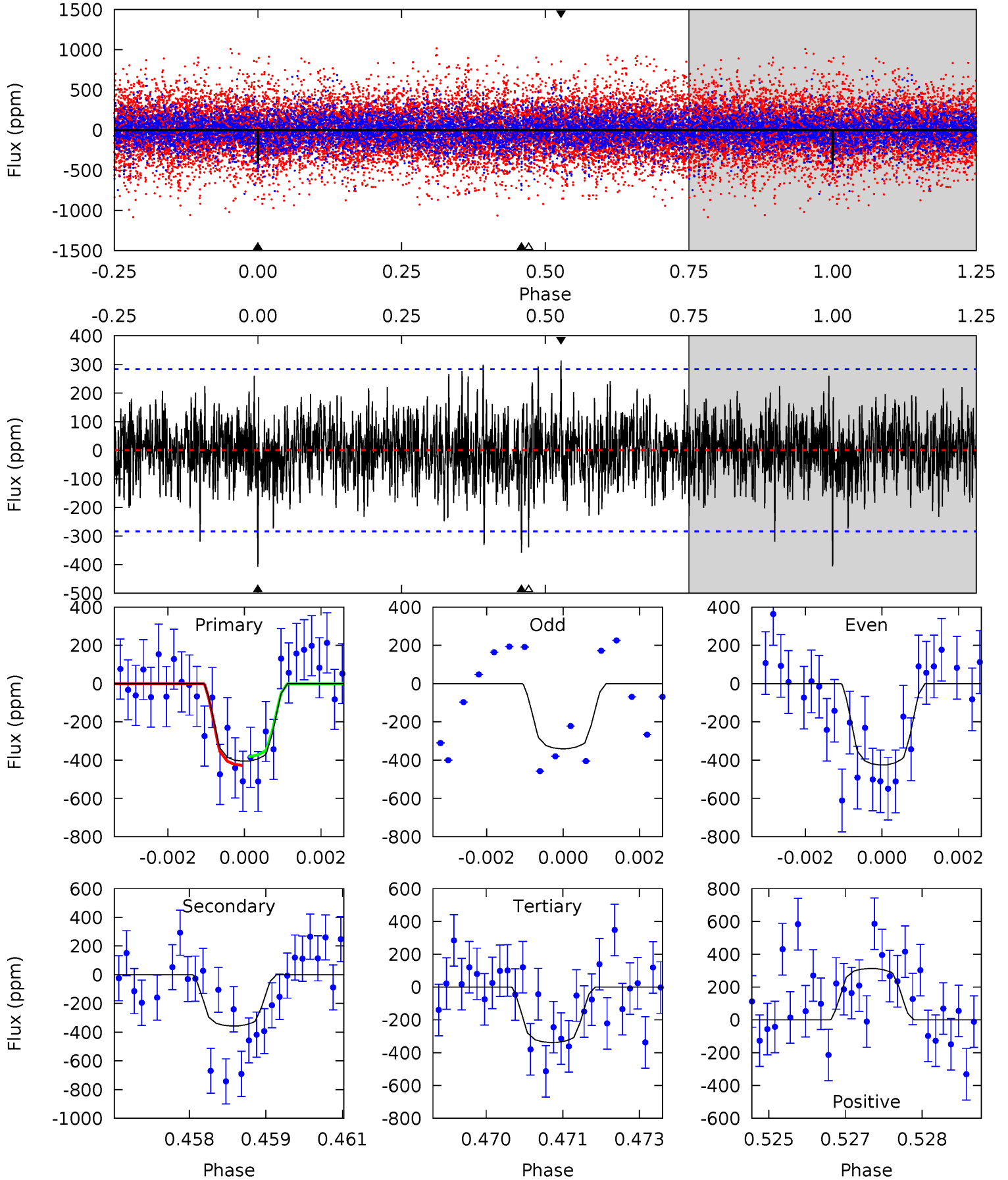
TCE 002860851-02 P= 69.283779 Days $T_0=161.350033$ (BKJD)



DV Model-Shift Uniqueness Test

002860851-02, P = 69.282777 Days, E = 92.078979 Days

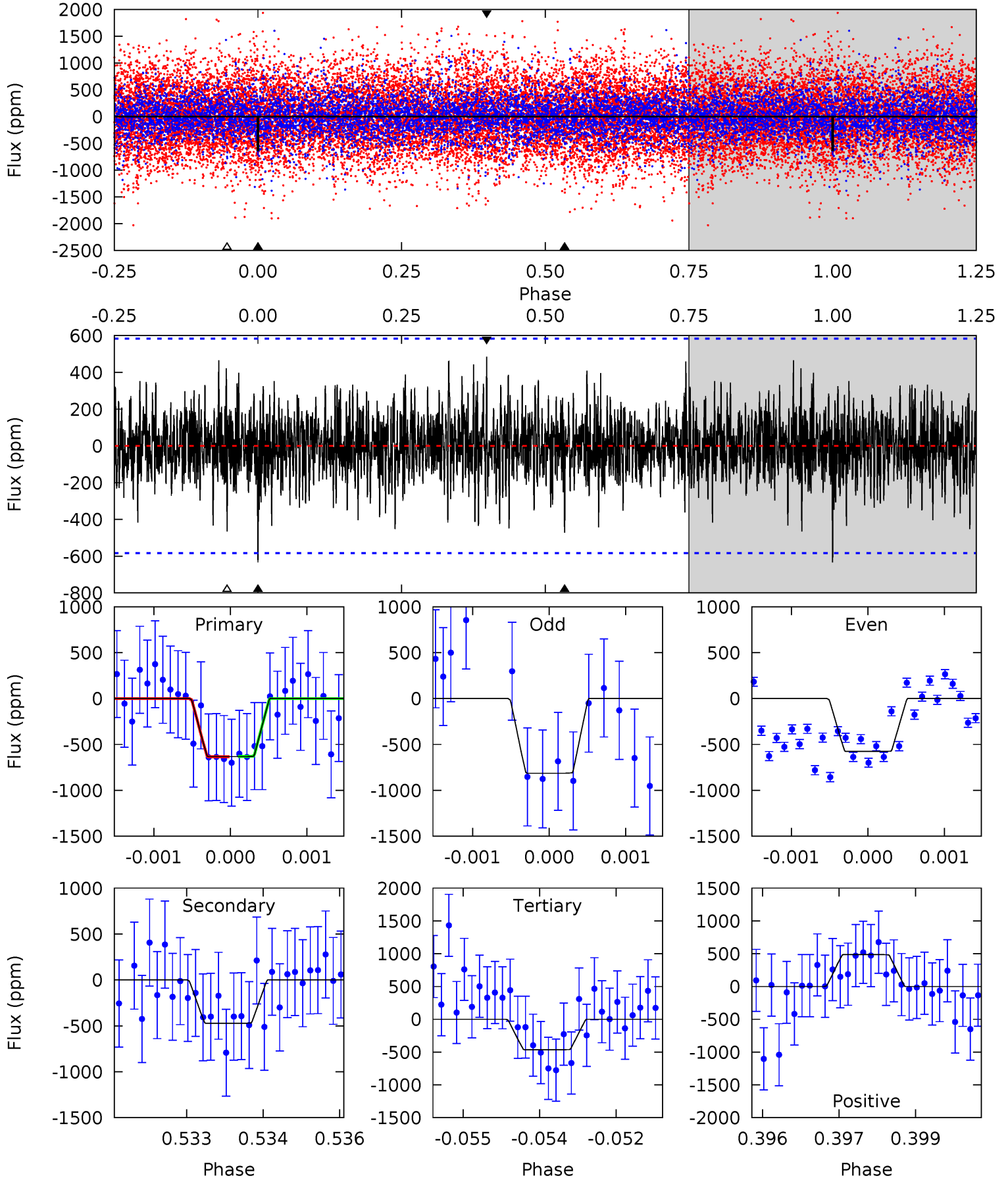
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.68	6.77	6.41	5.93	5.38	3.17	1.61	1.27	1.75	0.36	0.83	0.73	0.85	0.44	0.43



Alt Model-Shift Uniqueness Test

002860851-02, P = 69.283779 Days, E = 92.066254 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.84	4.35	4.29	4.48	5.38	3.18	1.26	1.55	1.36	0.06	-0.13	0.92	0.77	0.43	0.01



Stellar Parameters For KIC 002860851

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	8902^{+687}_{-687}	$3.826^{+0.384}_{-0.096}$	$-0.340^{+0.150}_{-0.200}$	$2.828^{+0.505}_{-1.179}$	$1.956^{+0.374}_{-0.336}$	$0.122^{+0.392}_{-0.036}$
	+8%/-8%	+10%/-3%	+44%/-59%	+18%/-42%	+19%/-17%	+322%/-30%
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 002860851-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-357 ± 53	$7.98^{+6.42}_{-5.16}$	1384^{+159}_{-167}	6953^{+7386}_{-1735}	517^{+3612}_{-358}
Alt.	-472 ± 108	$8.91^{+6.80}_{-5.21}$	1393^{+139}_{-155}	7137^{+5715}_{-1799}	548^{+2712}_{-376}

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

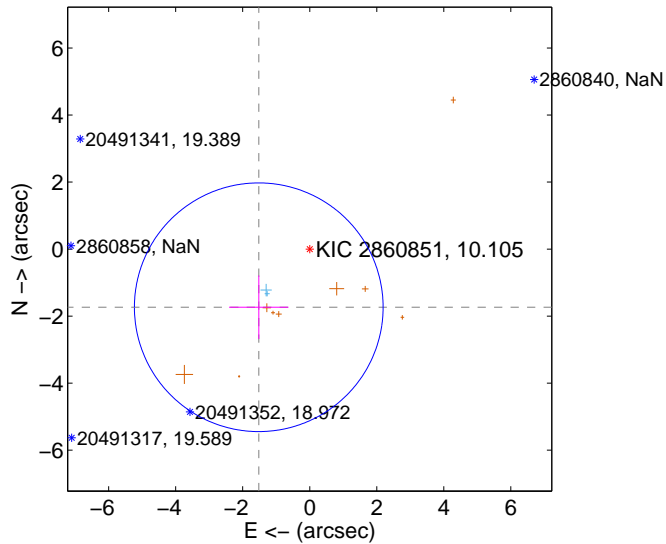
Supplemental centroid analysis for 002860851-02. **Kepler magnitude: 10.11.** Transit SNR 9.23

There are 3 quarters with good PRF difference image offsets

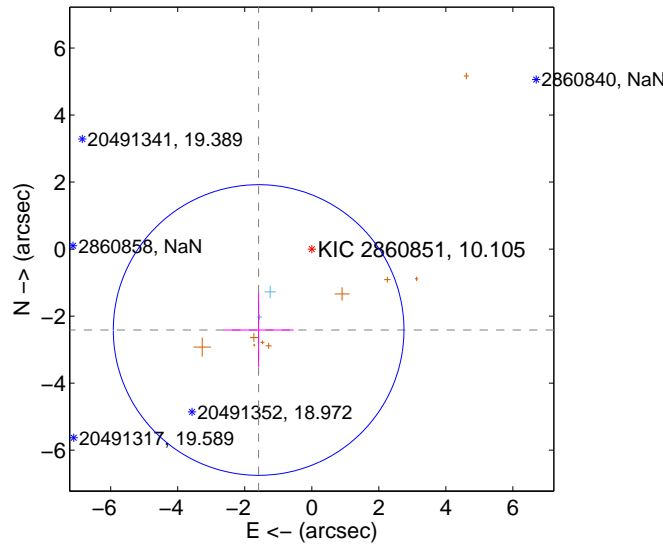
The direct PRF centroid is offset from the target star catalog position by about 0.38 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.307 ± 1.237	1.87	1.521 ± 0.887	-1.735 ± 0.946
PRF-fit source offset from KIC position	2.888 ± 1.445	2.00	1.586 ± 1.044	-2.414 ± 1.108
photometric centroid source offset	0.55 ± 0.38	1.44	-0.09 ± 0.24	-0.54 ± 0.38

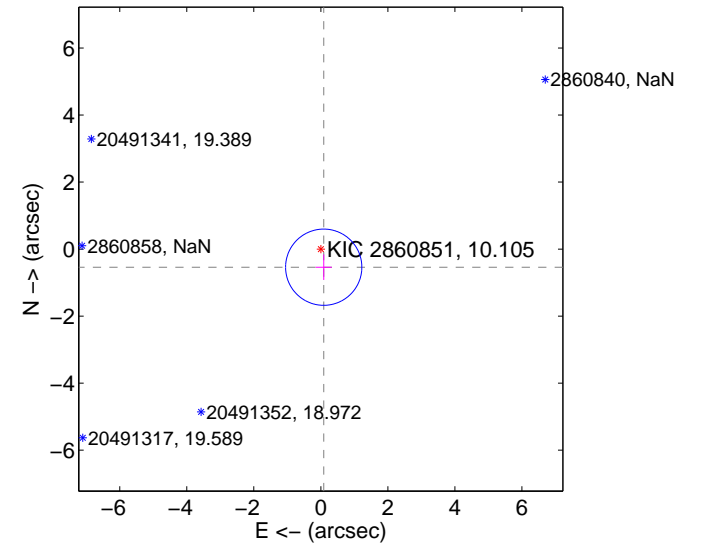
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

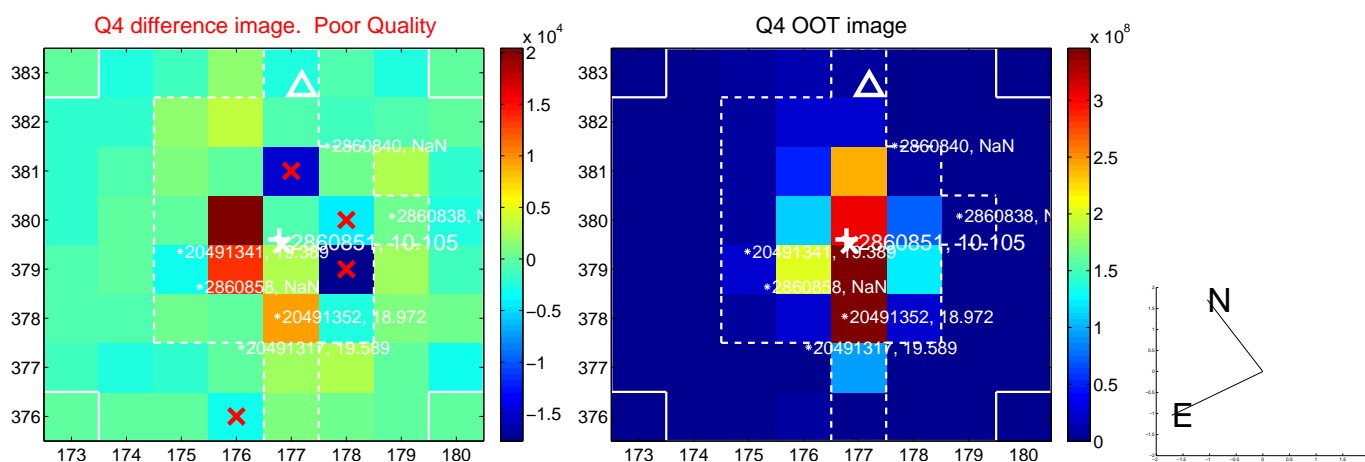
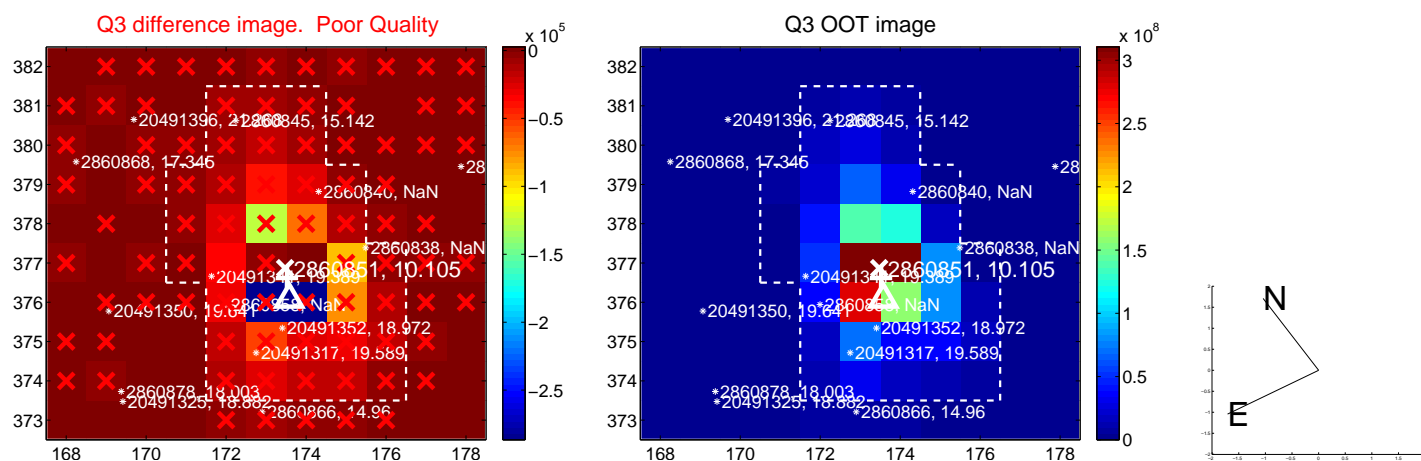
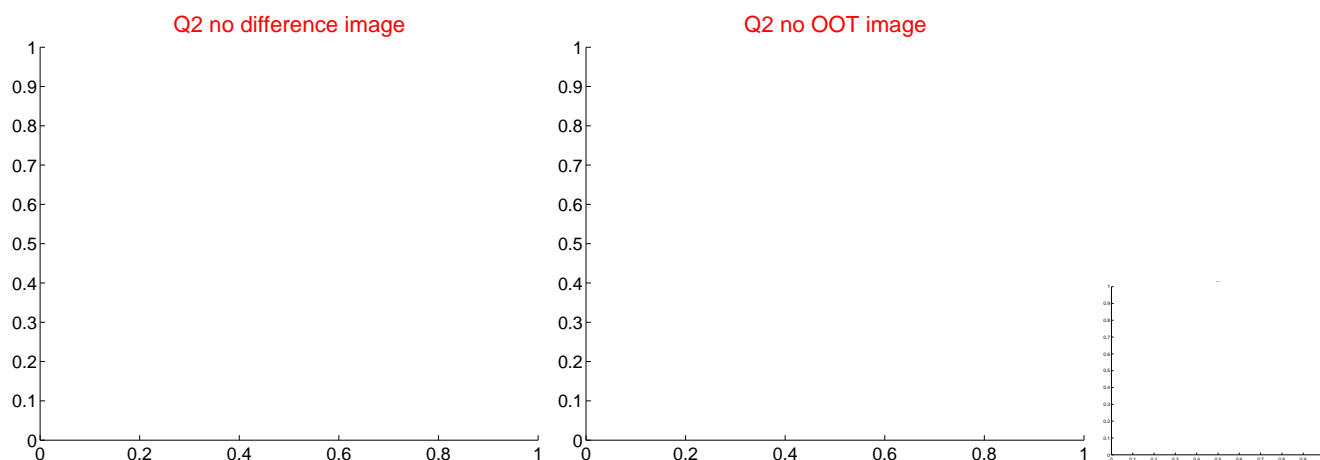
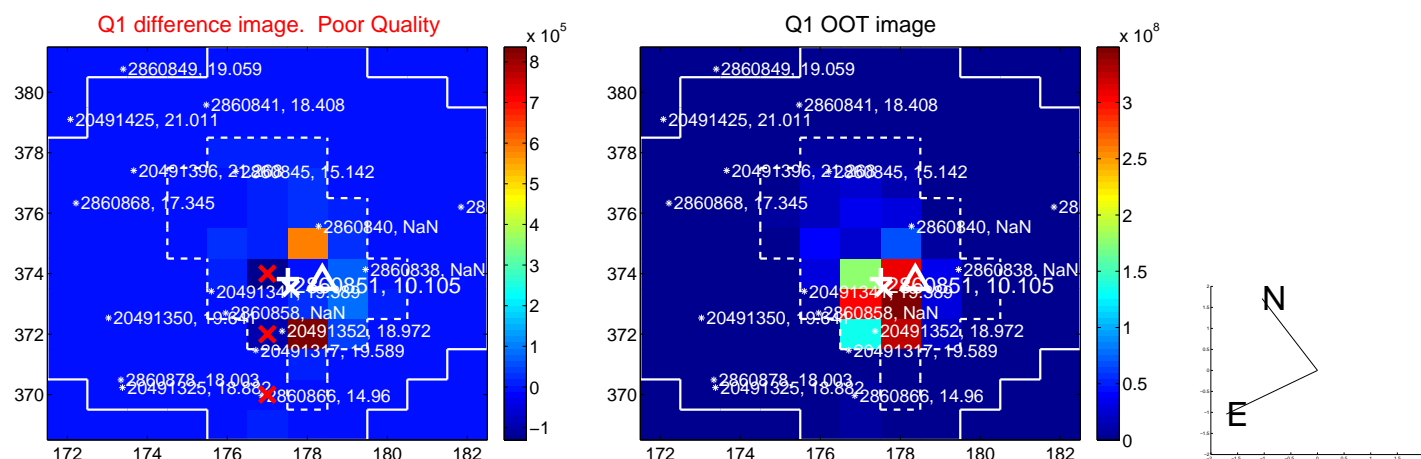


offset from photometric centroids

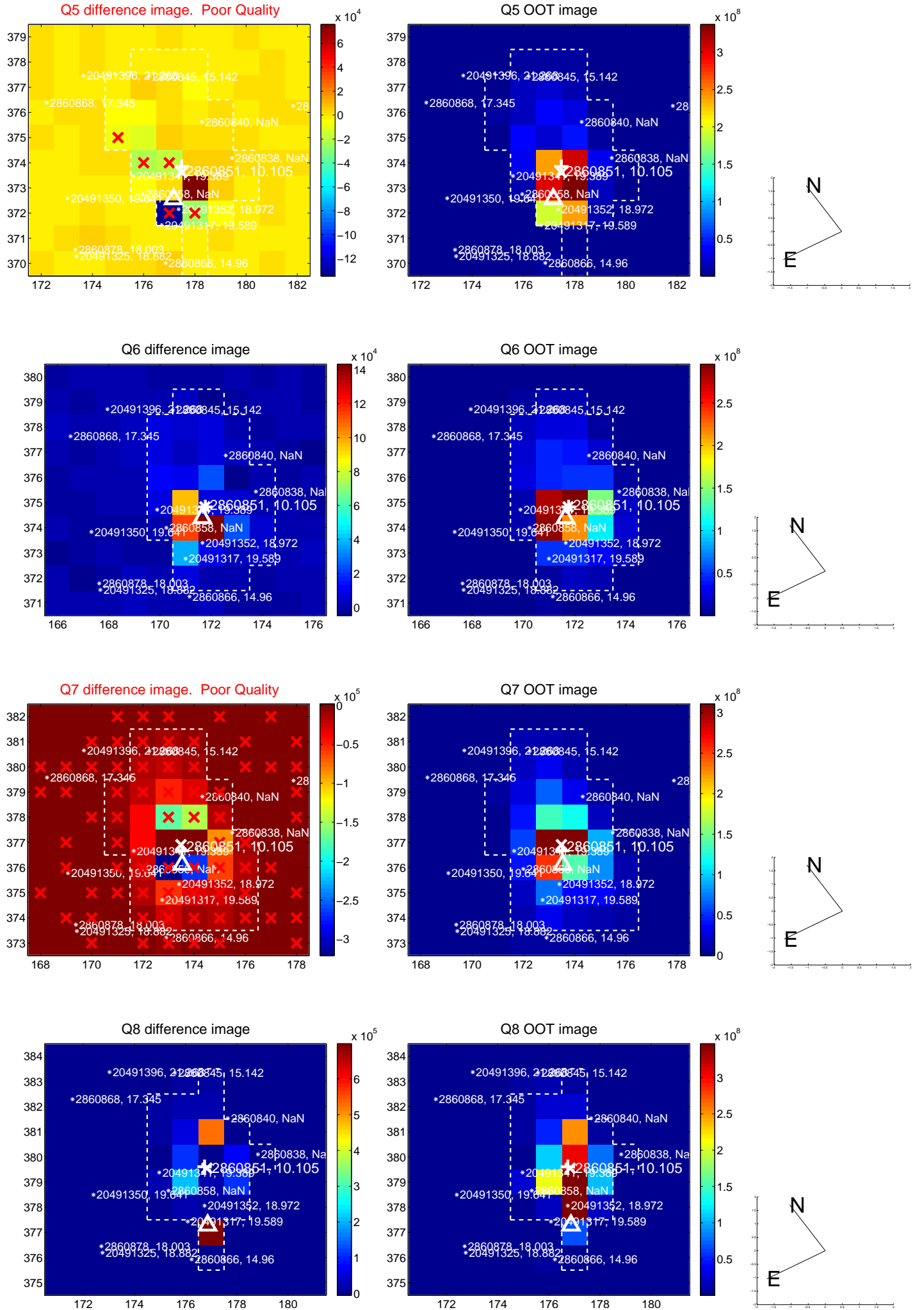


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

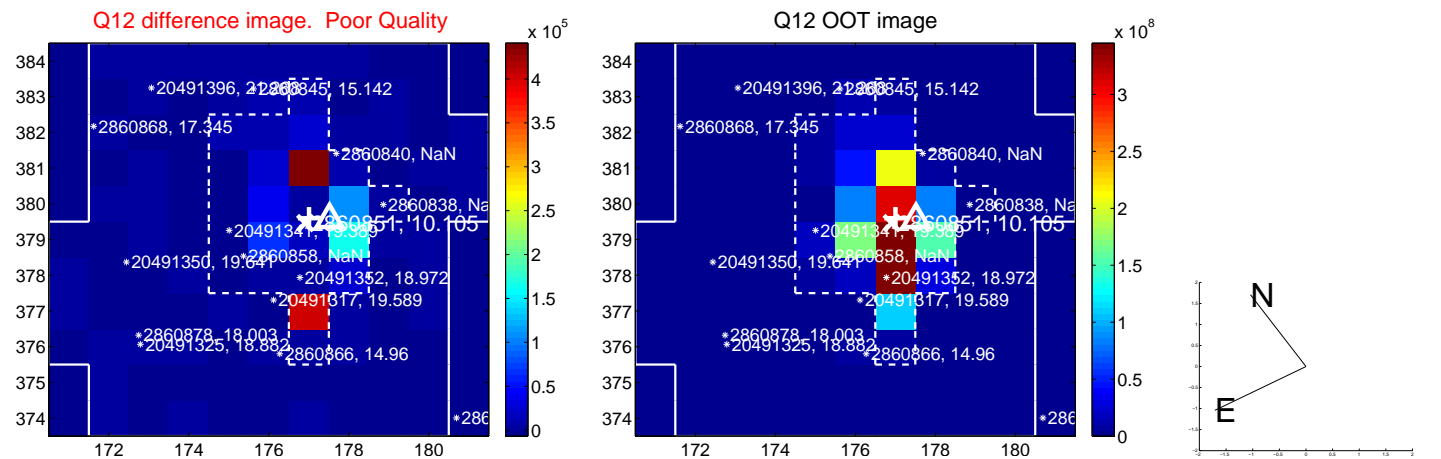
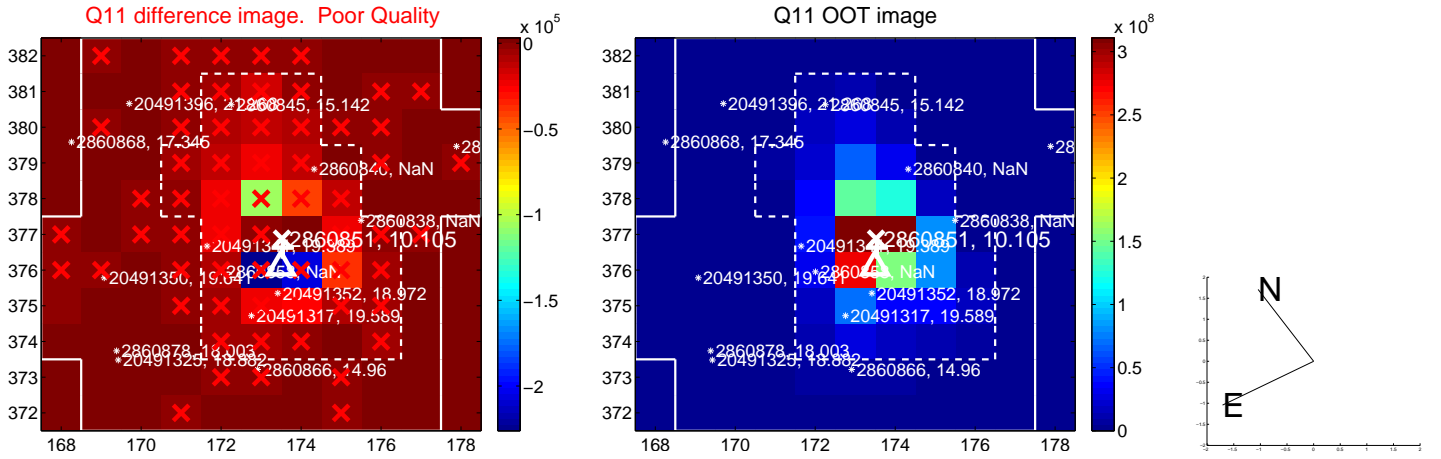
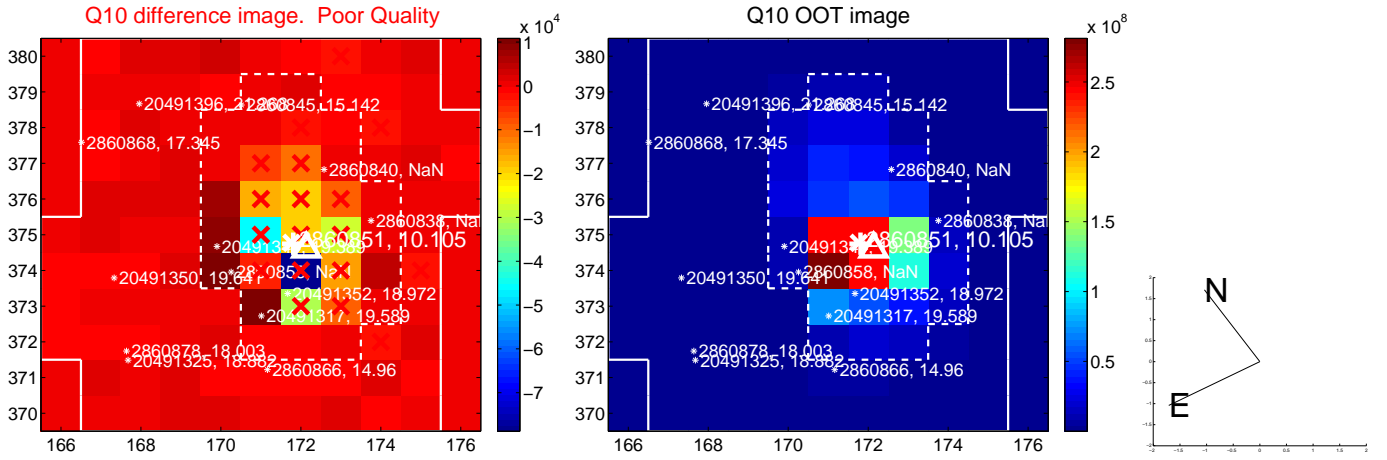
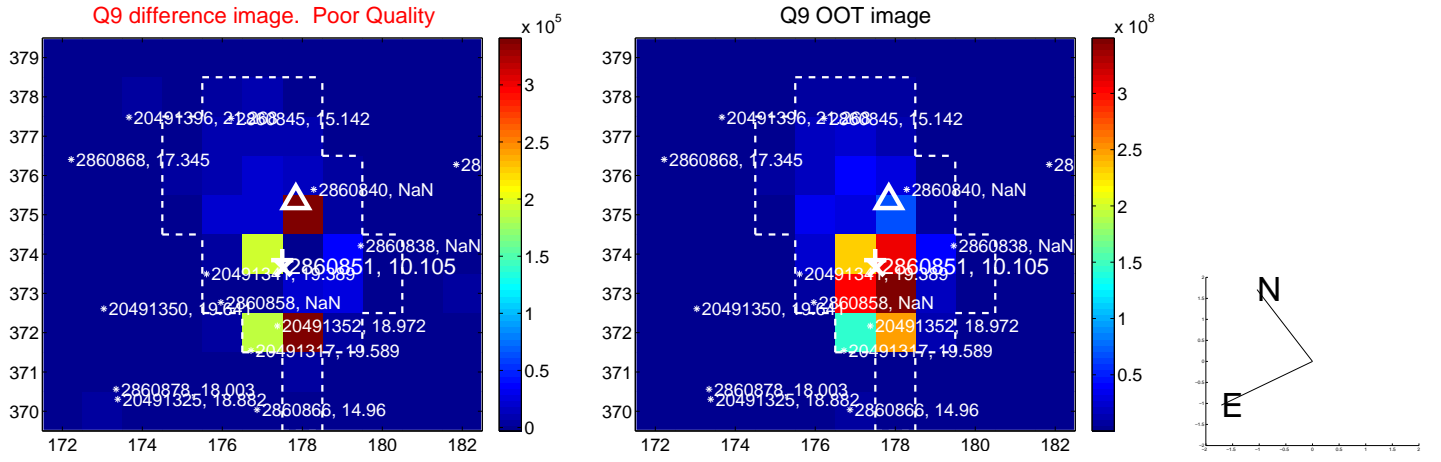
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



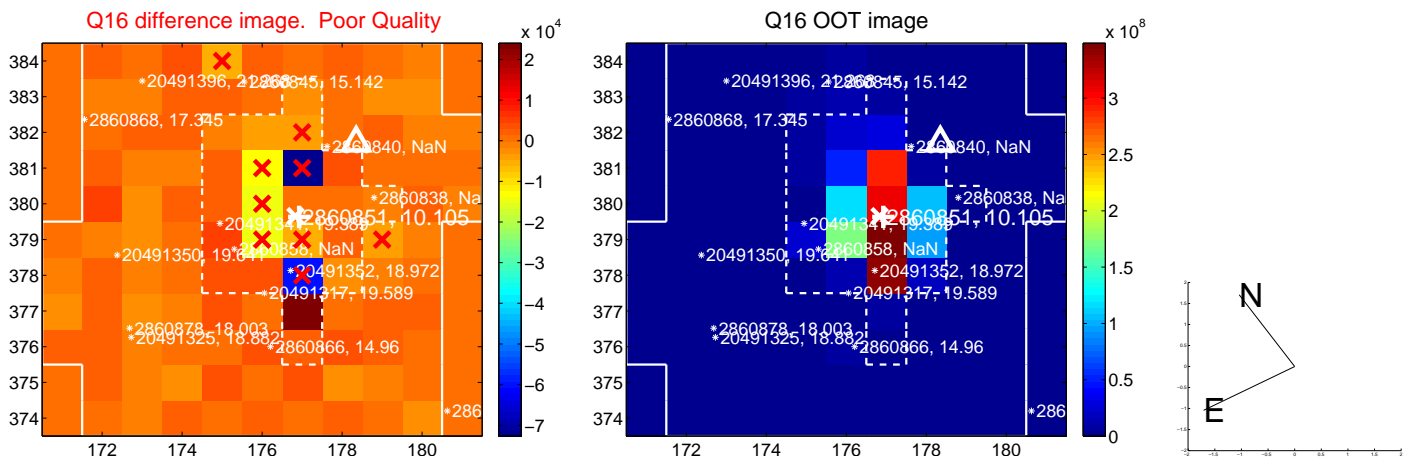
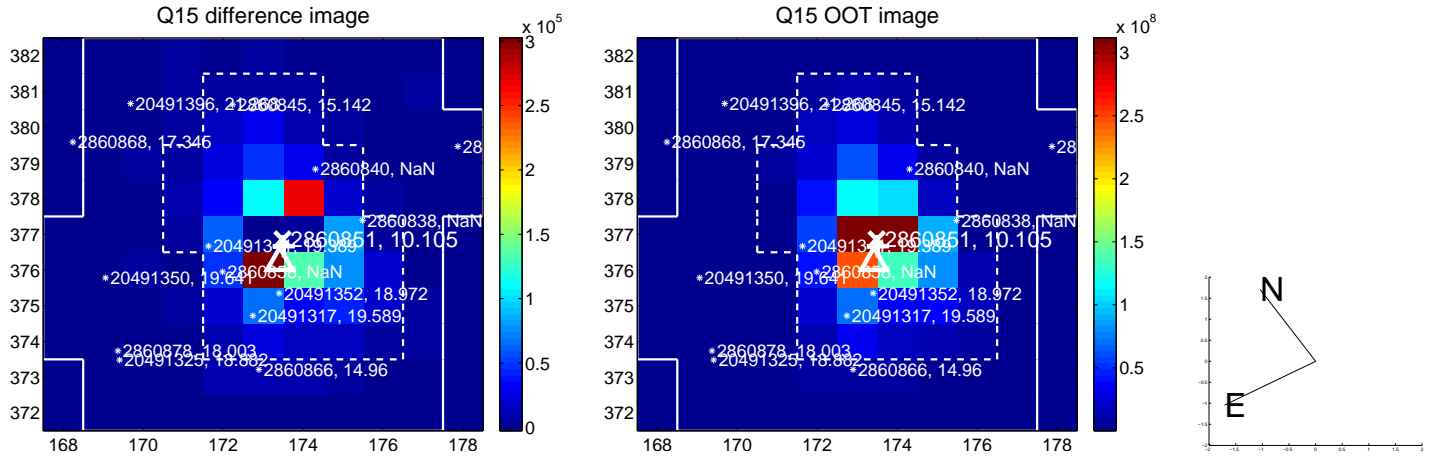
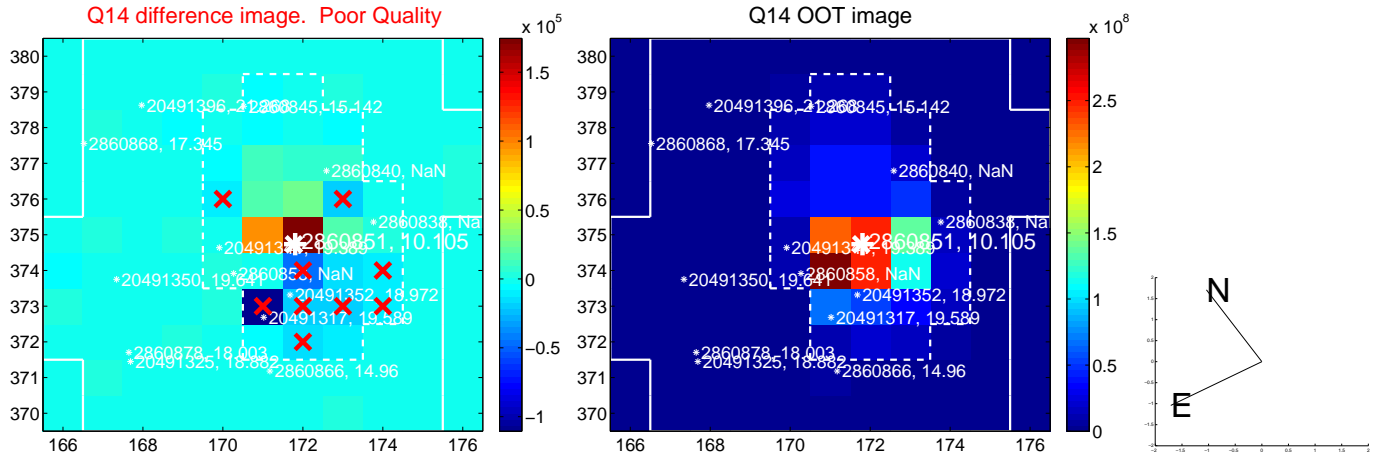
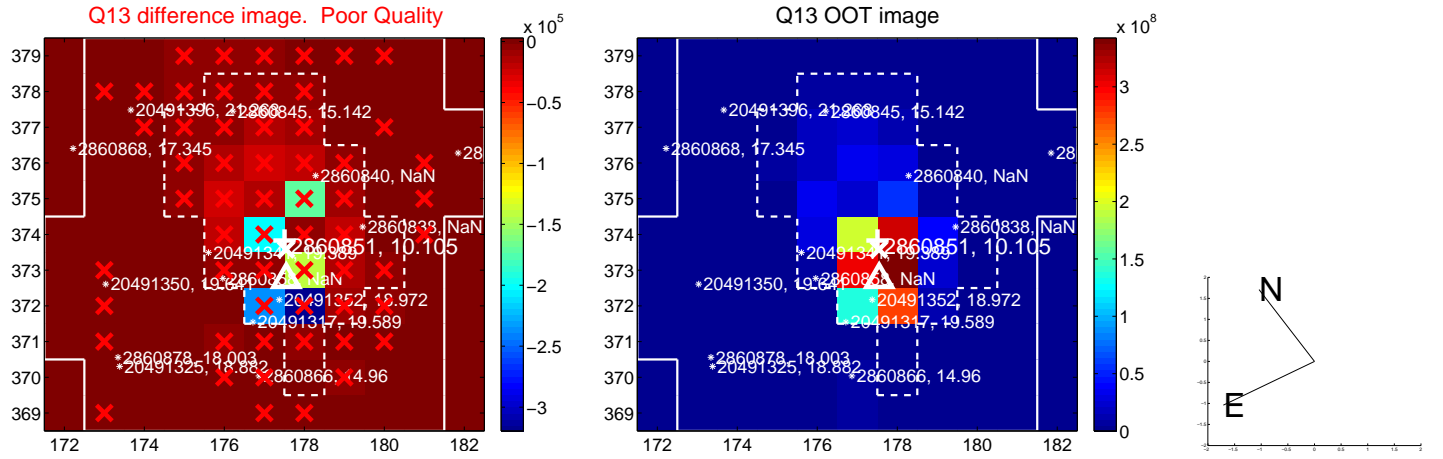
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



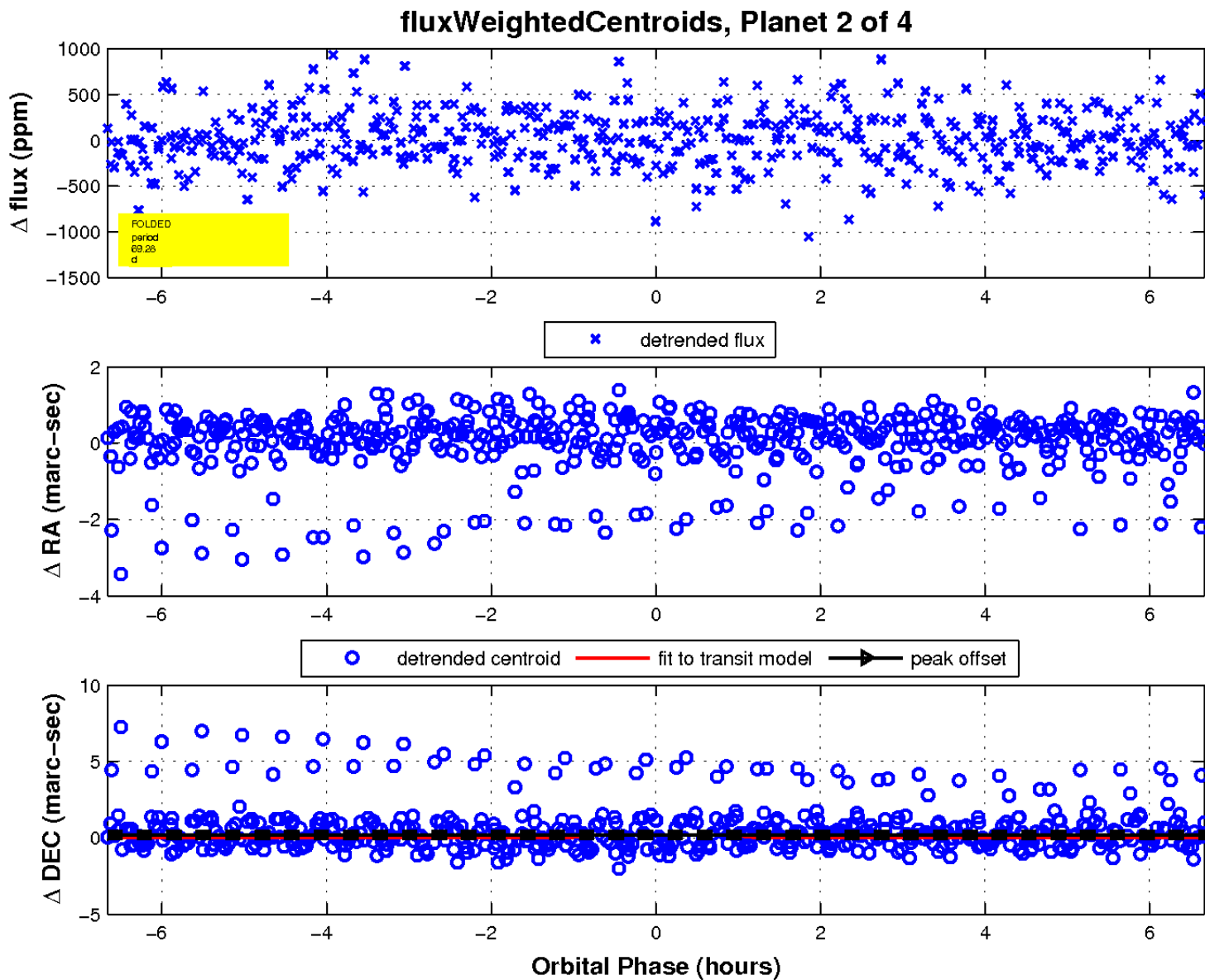
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

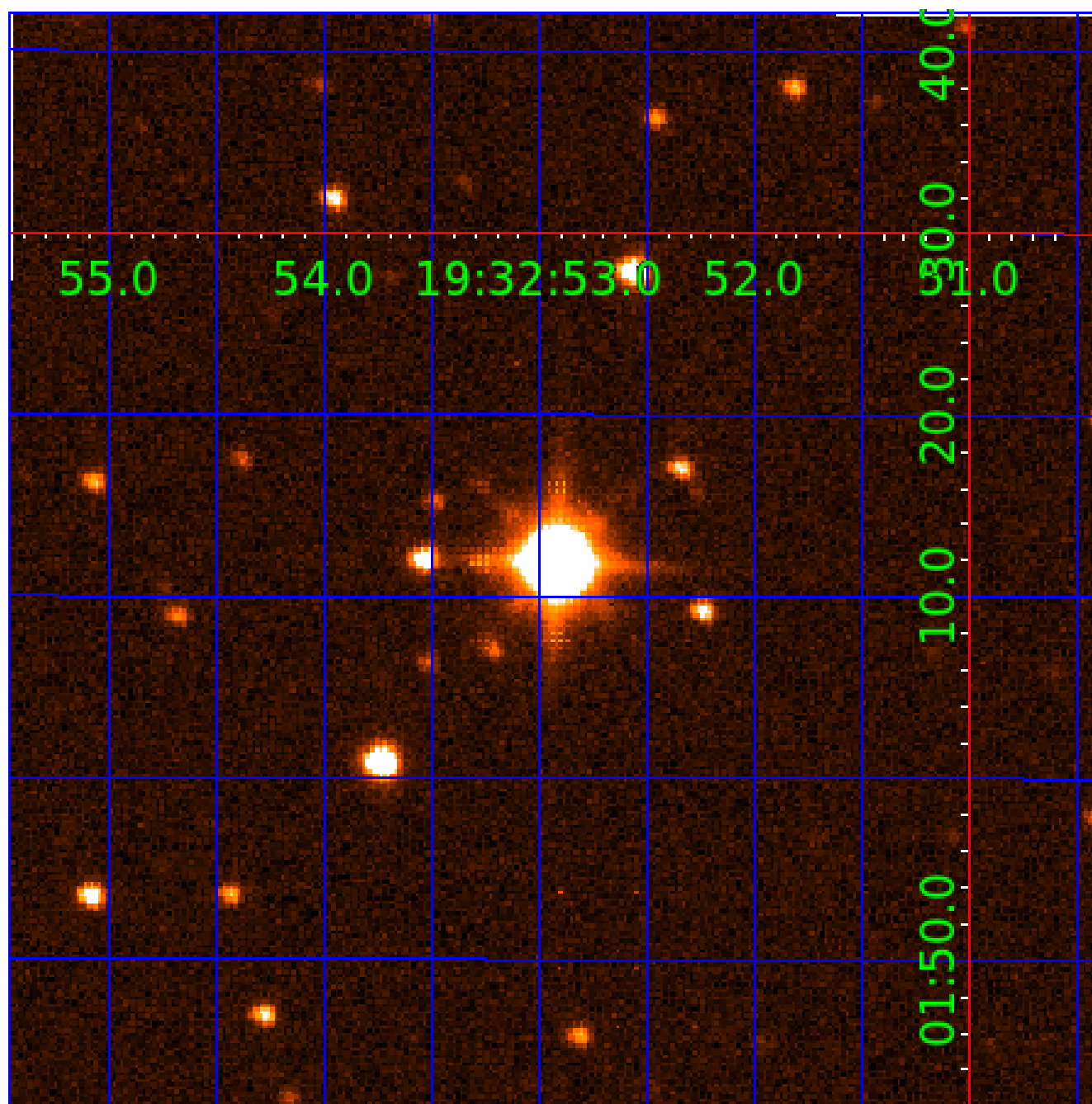


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 002860851

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})
002860851-01	OBS	No	1.196773	132.011602	42.1	6.790	11.9	13.8	2.83	8902	1.87	59131.00
002860851-02	OBS	No	69.282777	161.361756	489.5	2.230	9.4	9.2	2.83	8902	6.99	264.04
002860851-03	OBS	No	92.352446	142.271992	498.9	1.752	8.9	8.4	2.83	8902	11.89	179.98
002860851-04	OBS	No	65.098318	145.699157	361.1	1.847	9.2	9.2	2.83	8902	6.29	286.90

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002860851-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—CENT_SATURATED
002860851-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
002860851-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
002860851-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

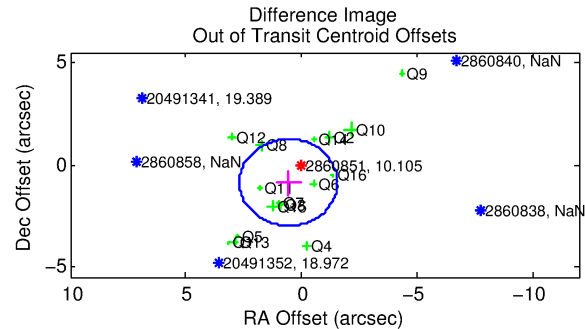
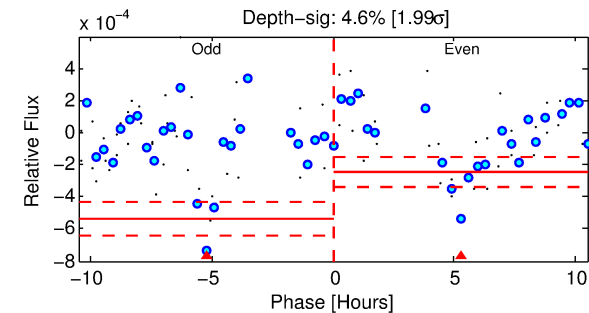
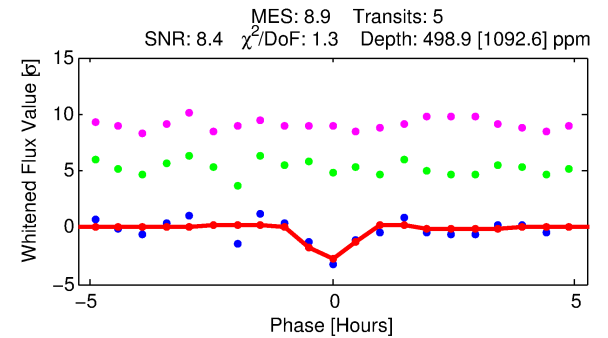
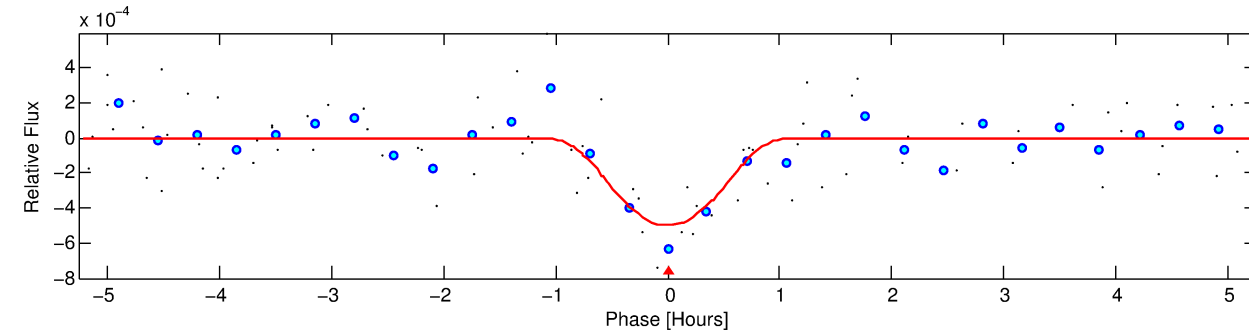
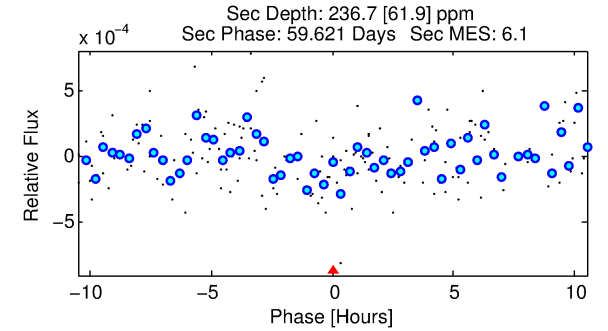
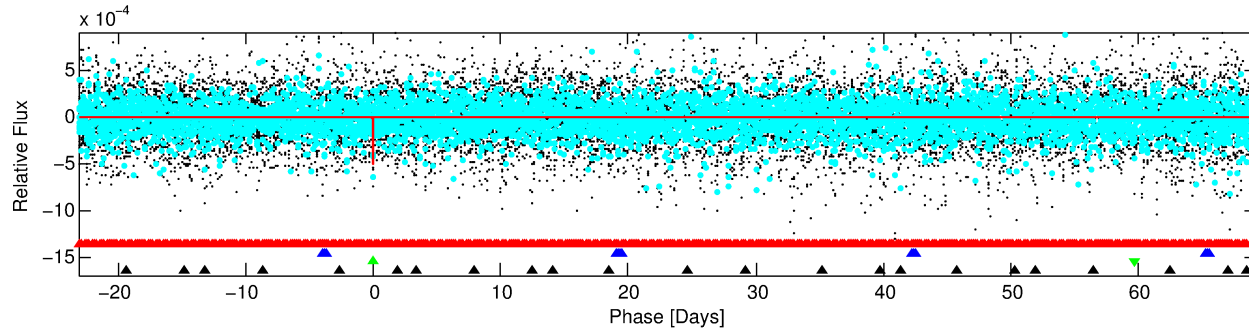
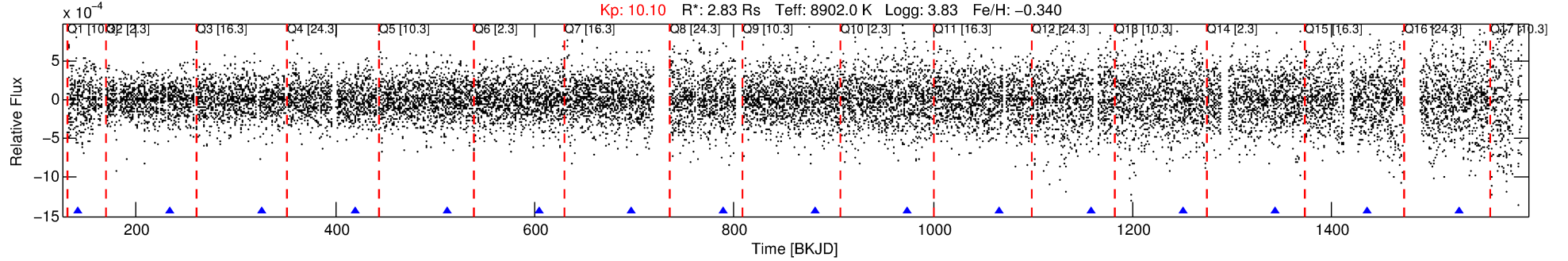
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002860851-03

No Significant Match Found

DV One-Page Summary

KIC: 2860851 Candidate: 3 of 4 Period: 92.352 d



DV Fit Results:

Period = 92.35245 [0.00065] d
Epoch = 142.2720 [0.0050] BKJD
Rp/R* = 0.0385 [0.4183]
a/R* = 112.94 [321.25]
b = 1.00 [0.55]
Seff = 179.98 [129.79]
Teq = 934 [168] K
Rp = 11.90 [129.19] Re
a = 0.5000 [0.2026] AU
Ag = 230.04 [4995.54] [0.05σ]
Teffp = 5624 [30521] K [0.15σ]

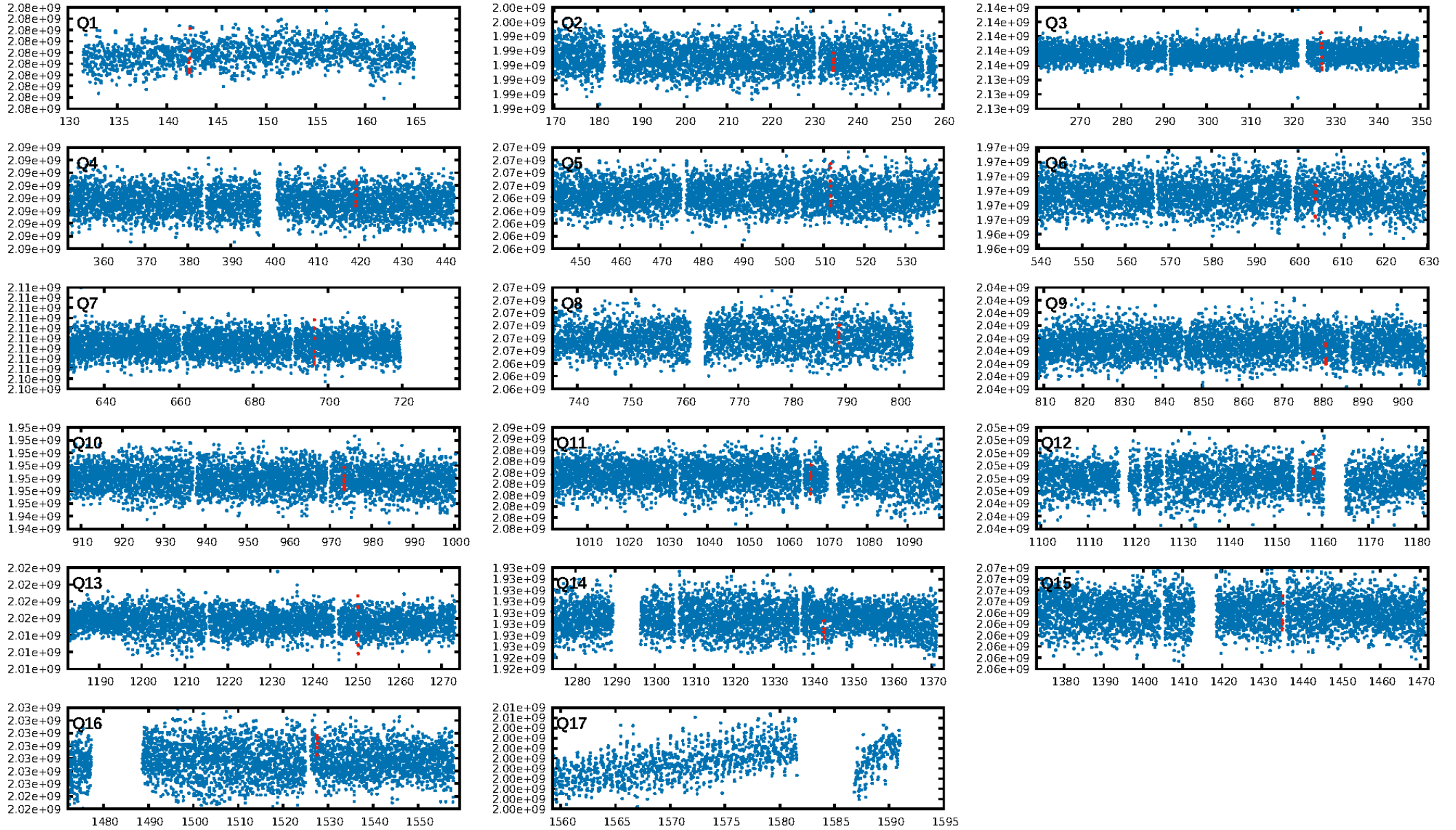
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [195.26σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 21.3%
ModelChiSquareGof-sig: 56.6%
Bootstrap-pfa: 6.07e-09
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: N/A
Centroid-sig: N/A
Centroid-so: 0.657 arcsec [1.42σ]
OotOffset-rm: 1.045 arcsec [1.48σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-rm: 1.900 arcsec [2.34σ]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.50 [8/16]
DiffImageOverlap-fno: 0.31 [5/16]

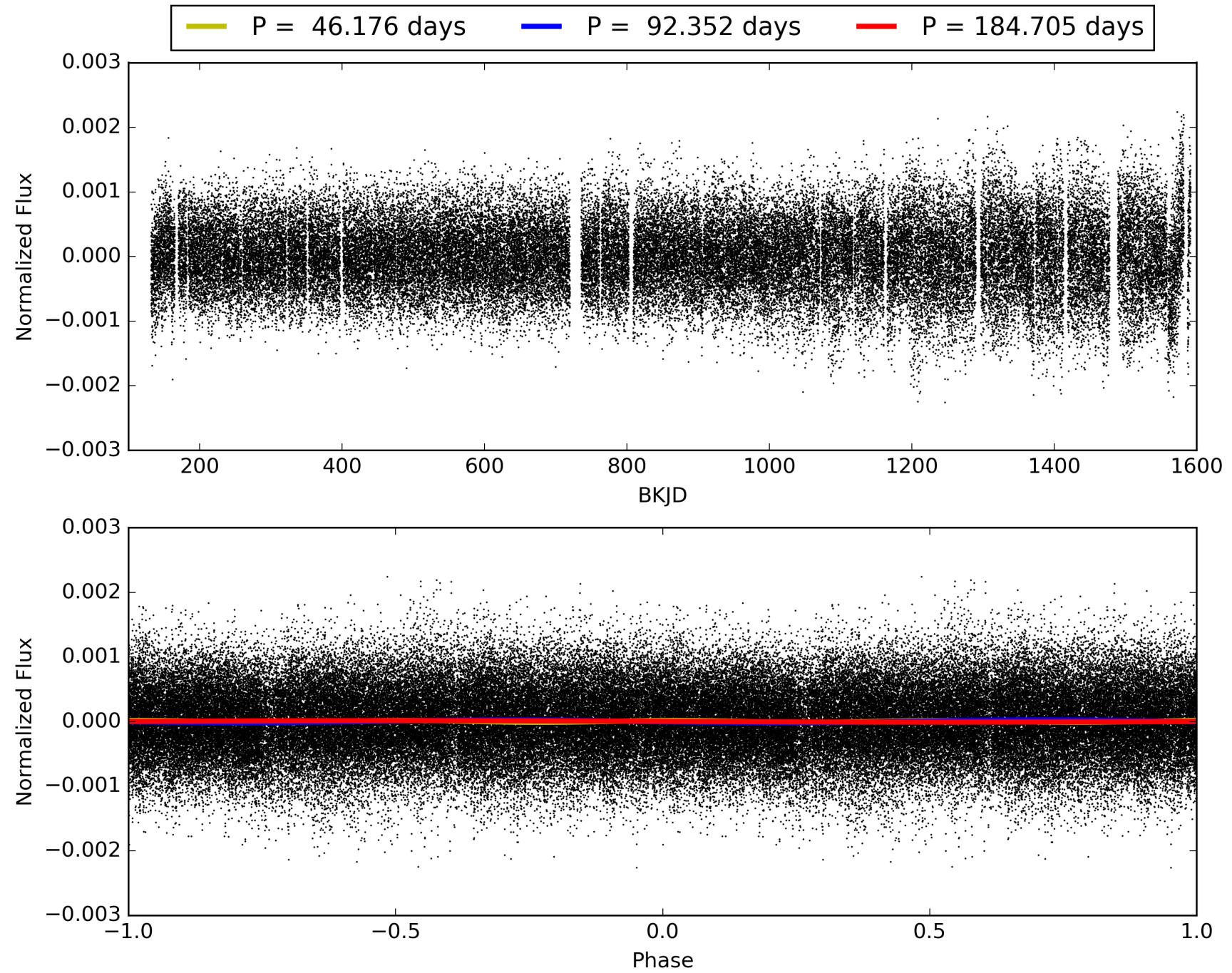
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 04:47:45 Z

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

TCE 002860851-03, PDC Light Curves

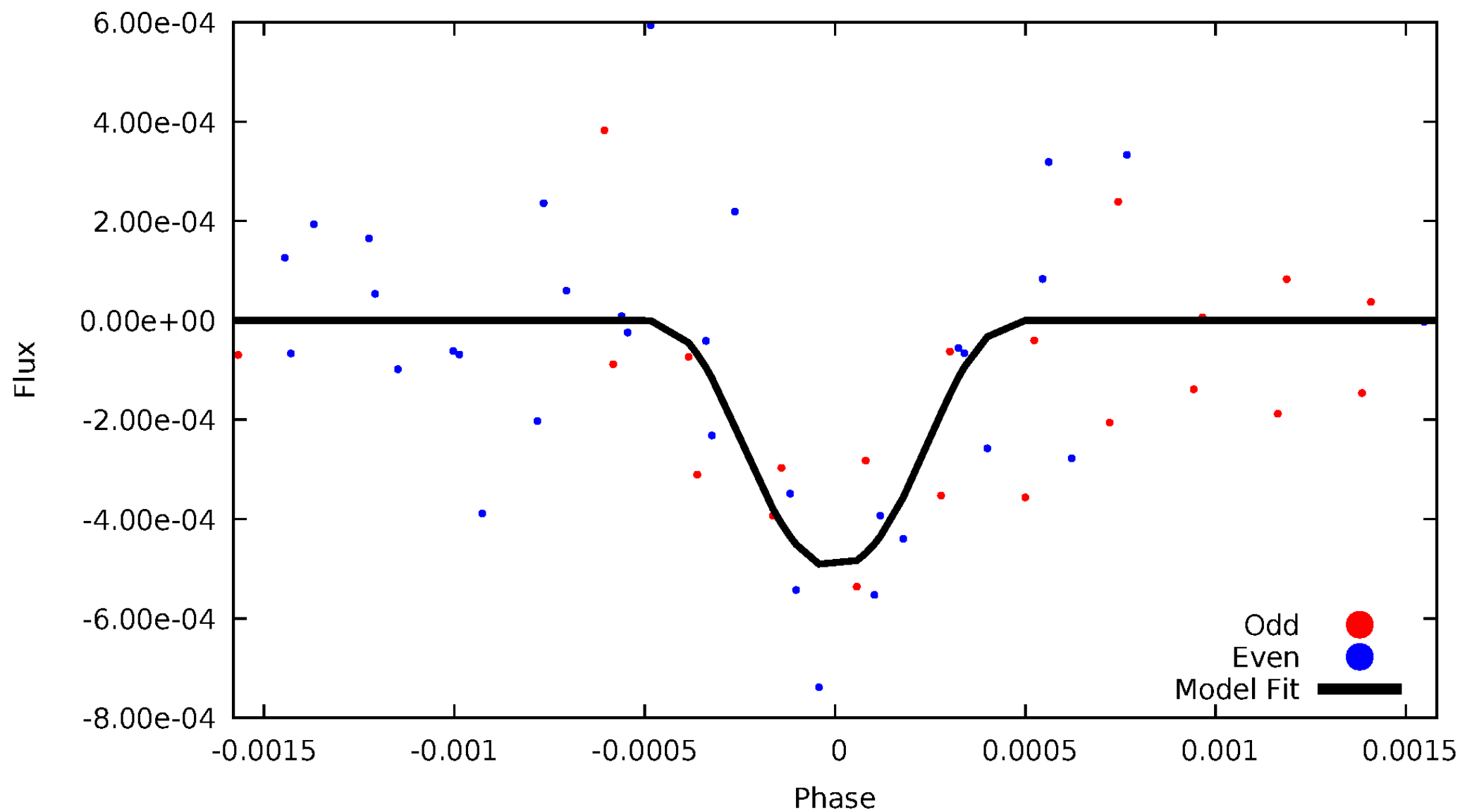


TCE 002860851-03



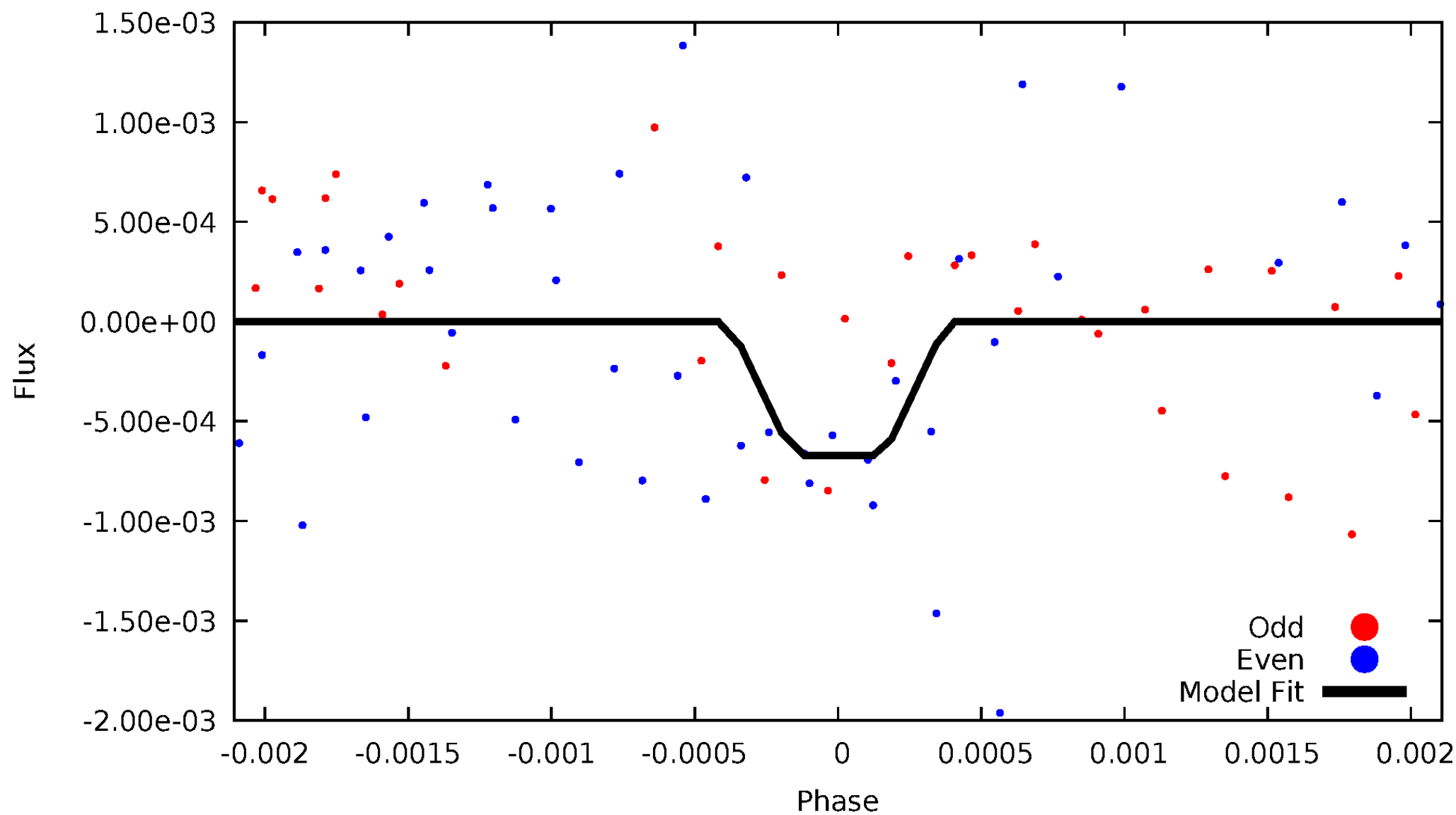
DV Odd/Even

TCE 002860851-03



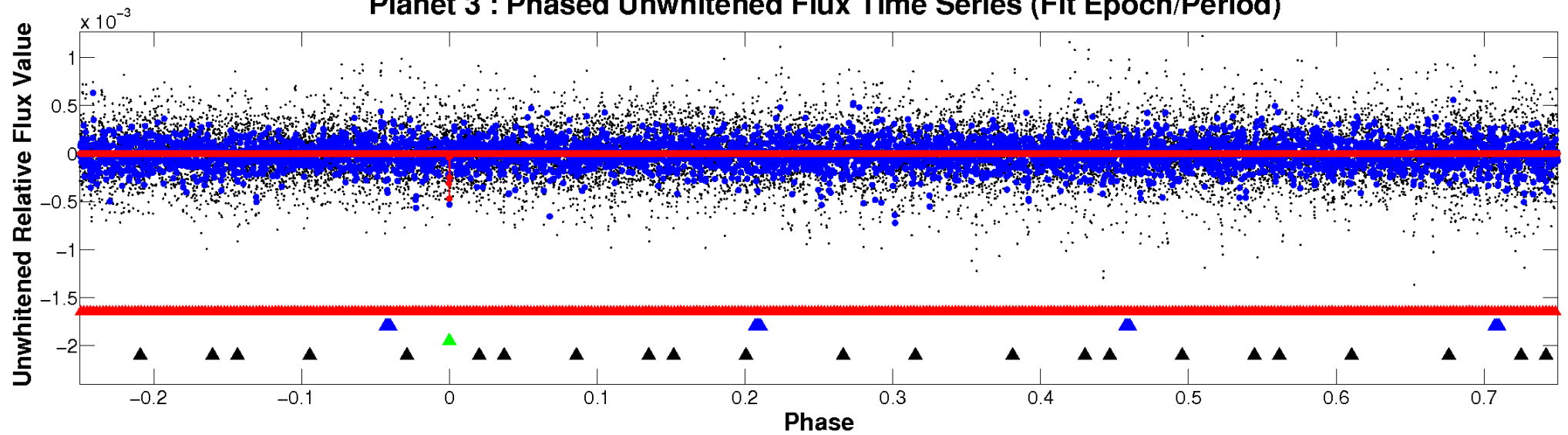
ALT Odd/Even

TCE 002860851-03

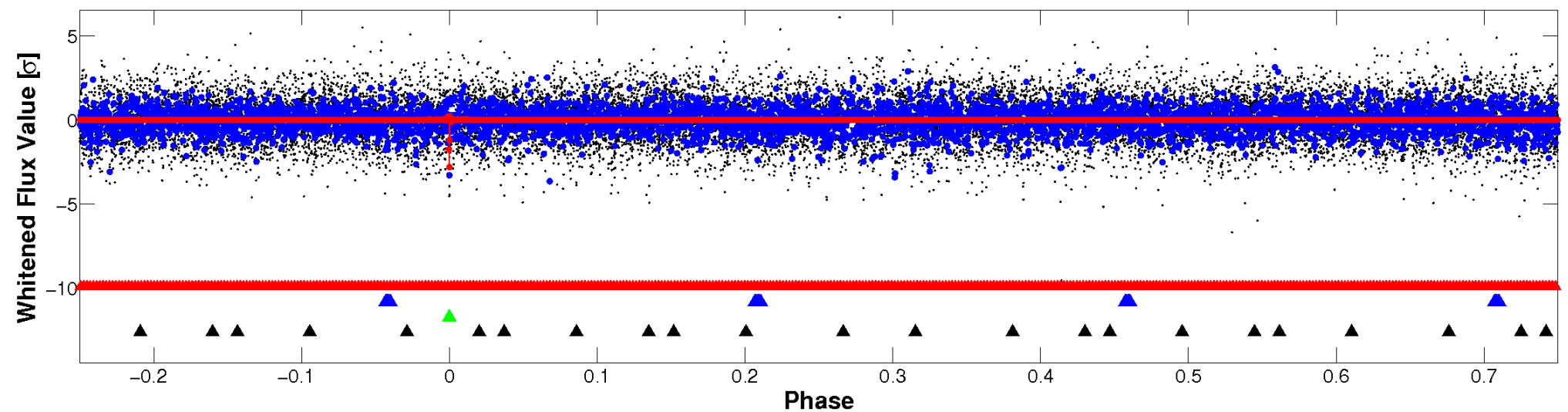


Non-Whitened Vs. Whitened Light Curve

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

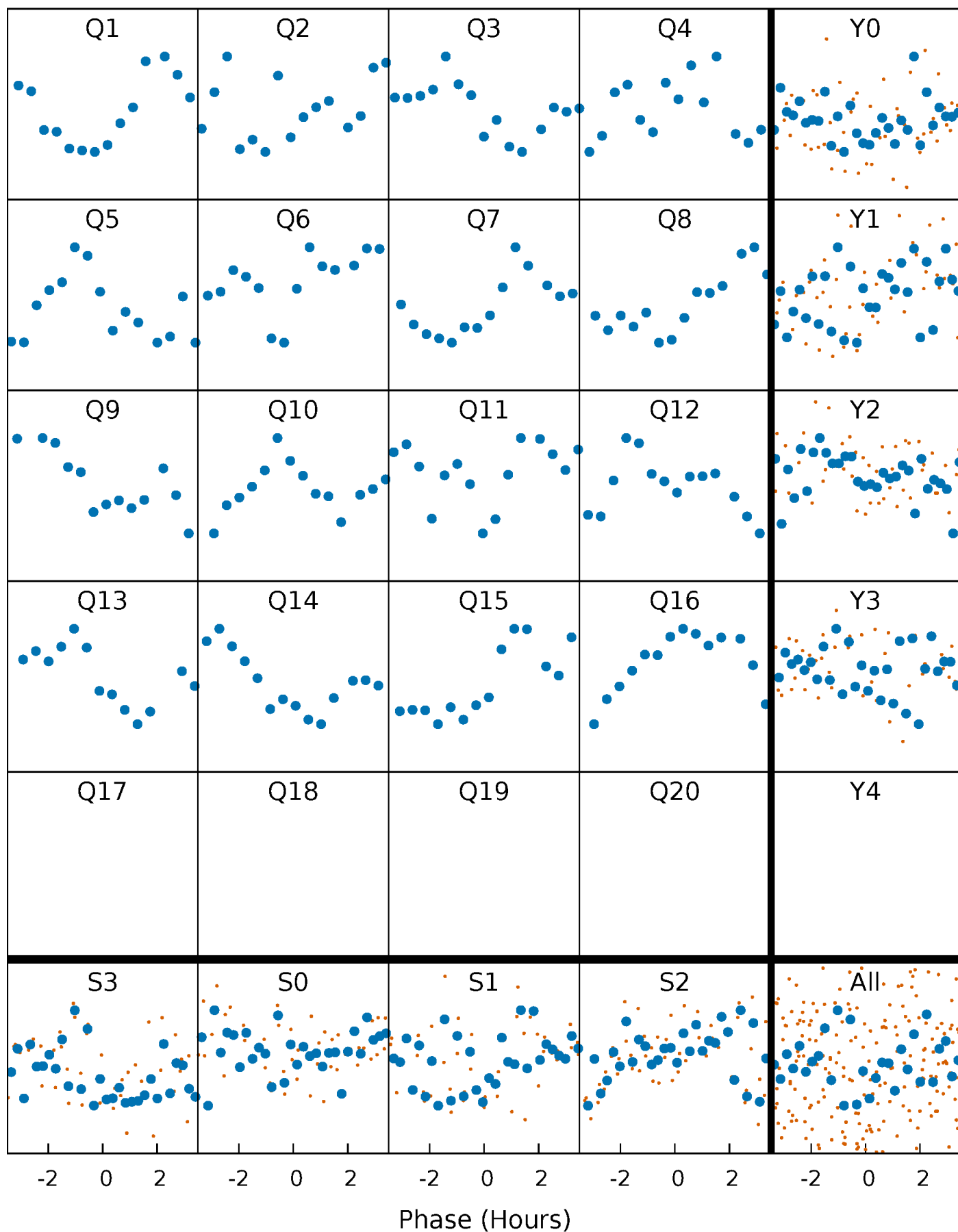


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



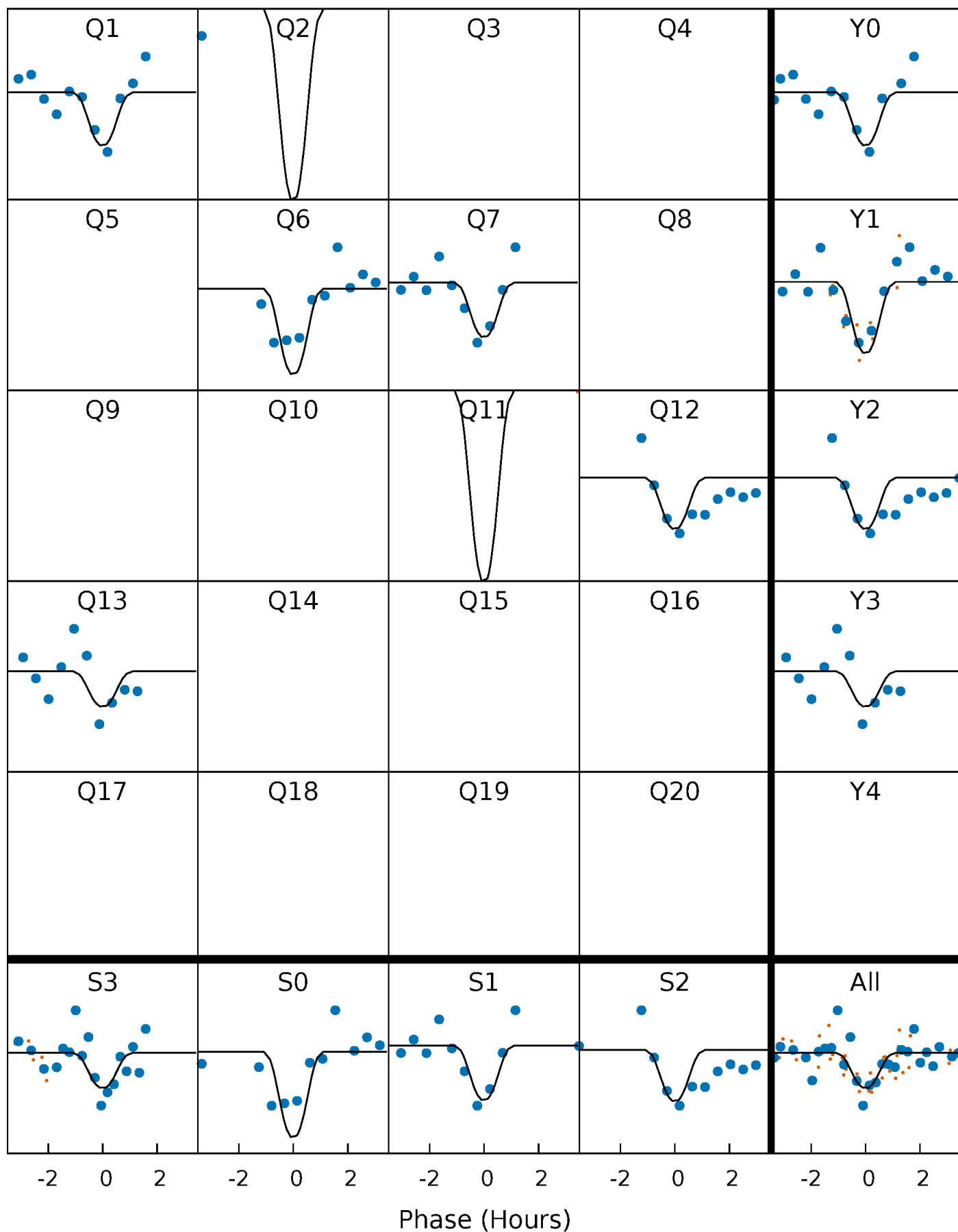
PDC Quarter-Phased Transit Curves

TCE 002860851-03 P= 92.352446 Days $T_0=142.271992$ (BKJD)



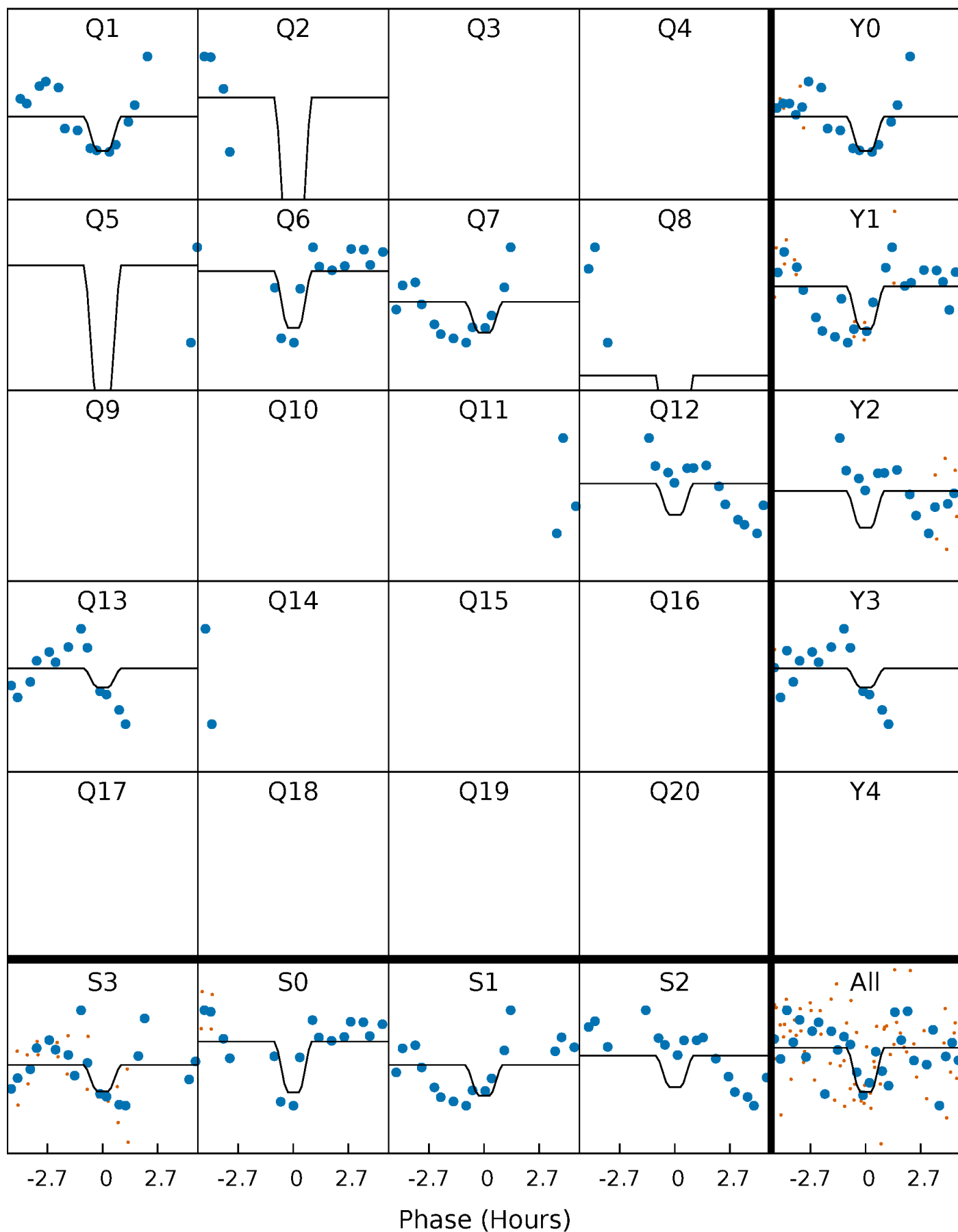
DV Quarter-Phased Transit Curves

TCE 002860851-03 $P = 92.352446$ Days $T_0 = 142.271992$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

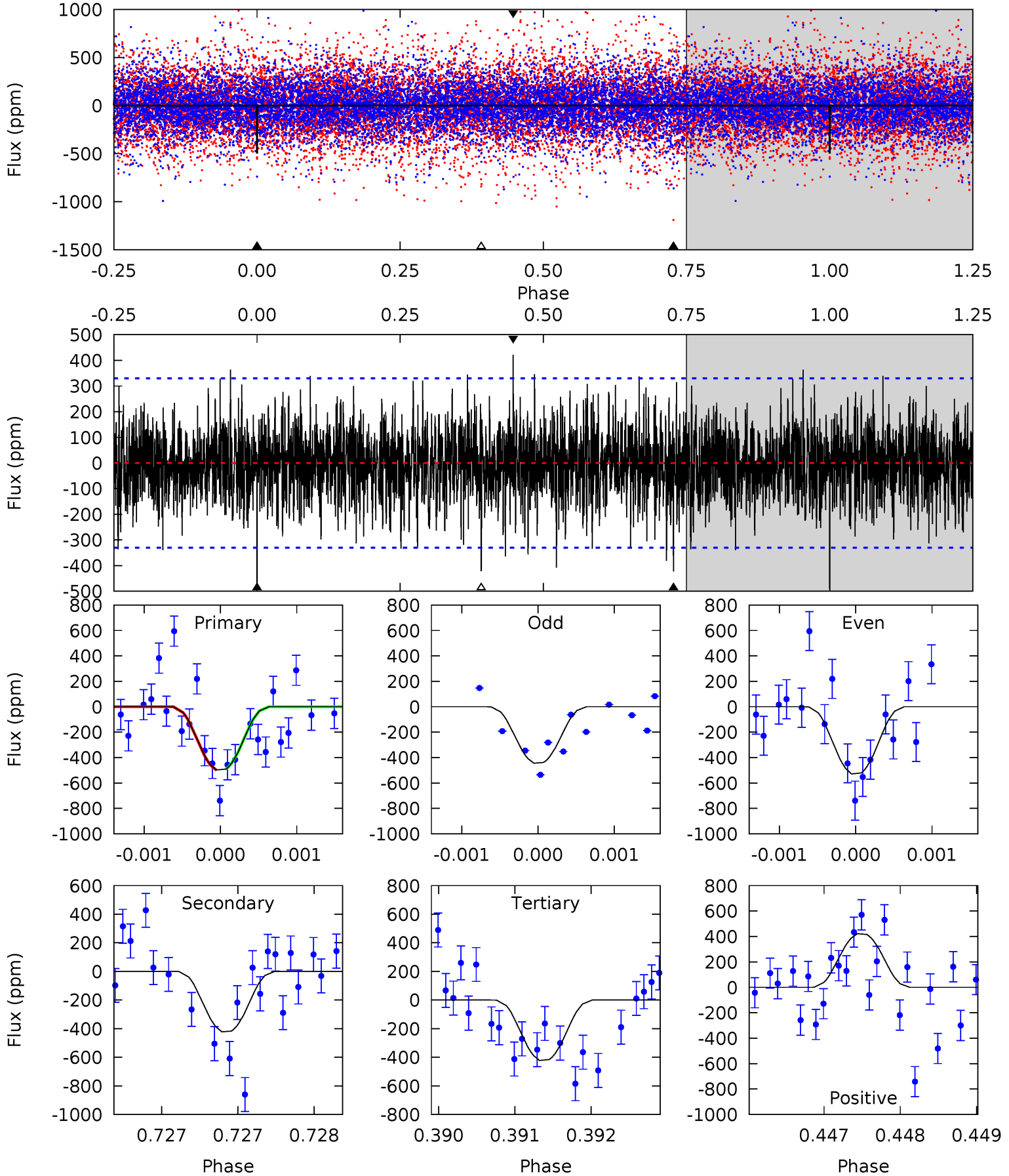
TCE 002860851-03 $P = 92.354594$ Days $T_0 = 142.251466$ (BKJD)



DV Model-Shift Uniqueness Test

002860851-03, P = 92.352446 Days, E = 49.919546 Days

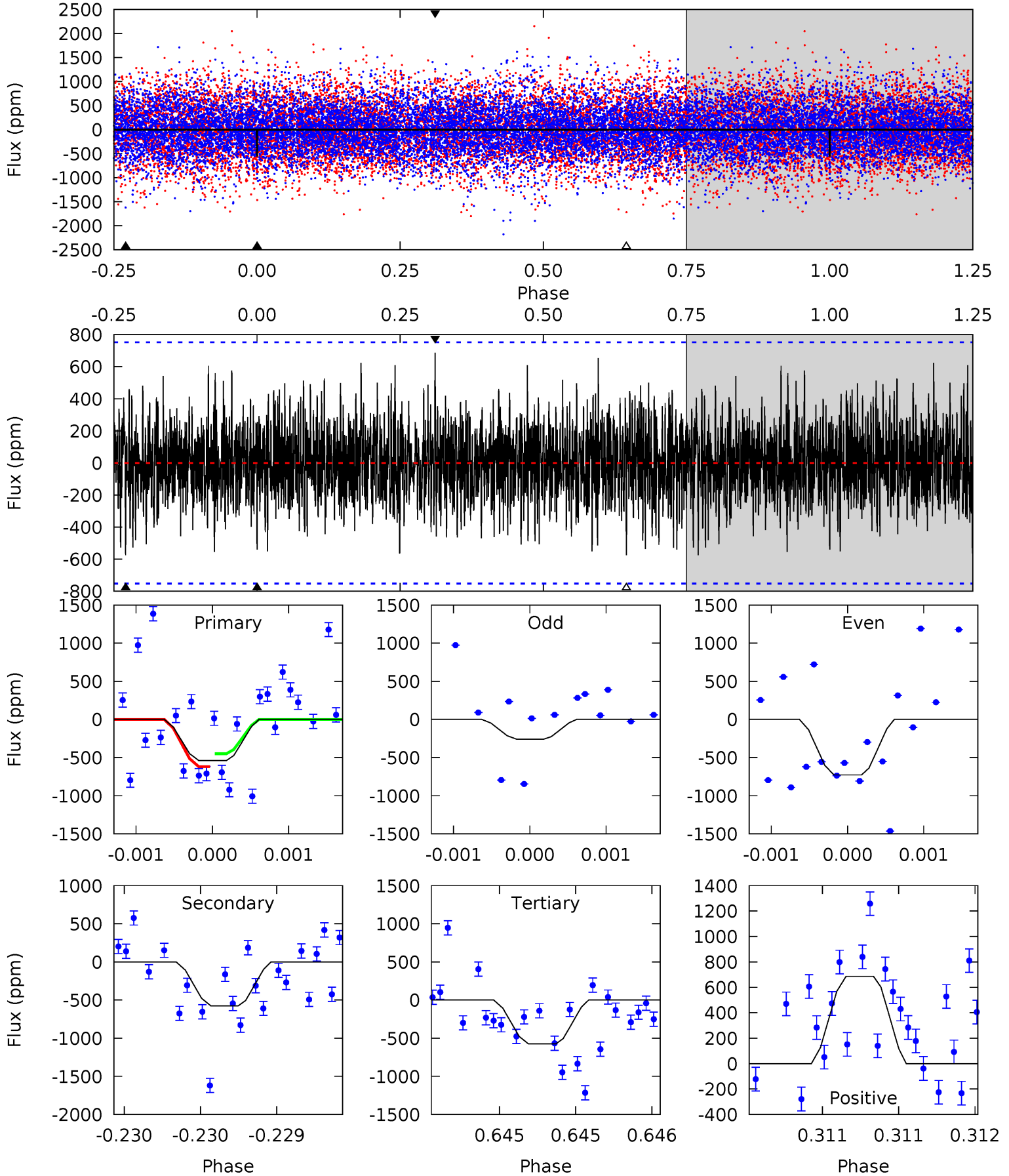
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.28	7.03	7.02	7.01	5.49	3.36	1.84	1.26	1.26	0.01	0.02	0.68	0.94	0.46	0.09



Alt Model-Shift Uniqueness Test

002860851-03, P = 92.354594 Days, E = 49.896872 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.97	4.23	4.22	5.04	5.52	3.40	1.39	-0.25	-1.08	0.01	-0.82	1.71	0.76	0.54	0.62



Stellar Parameters For KIC 002860851

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	8902^{+687}_{-687}	$3.826^{+0.384}_{-0.096}$	$-0.340^{+0.150}_{-0.200}$	$2.828^{+0.505}_{-1.179}$	$1.956^{+0.374}_{-0.336}$	$0.122^{+0.392}_{-0.036}$
	+8%/-8%	+10%/-3%	+44%/-59%	+18%/-42%	+19%/-17%	+322%/-30%
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 002860851-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-423 ± 60	$81.91^{+96.37}_{-59.57}$	1266^{+124}_{-164}	2917^{+1637}_{-548}	$8.878^{+120.929}_{-7.041}$
Alt.	-575 ± 136	$79.76^{+92.49}_{-56.13}$	1262^{+135}_{-152}	3061^{+1564}_{-567}	13^{+128}_{-10}

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 $A_{obs} \gg 1.0$

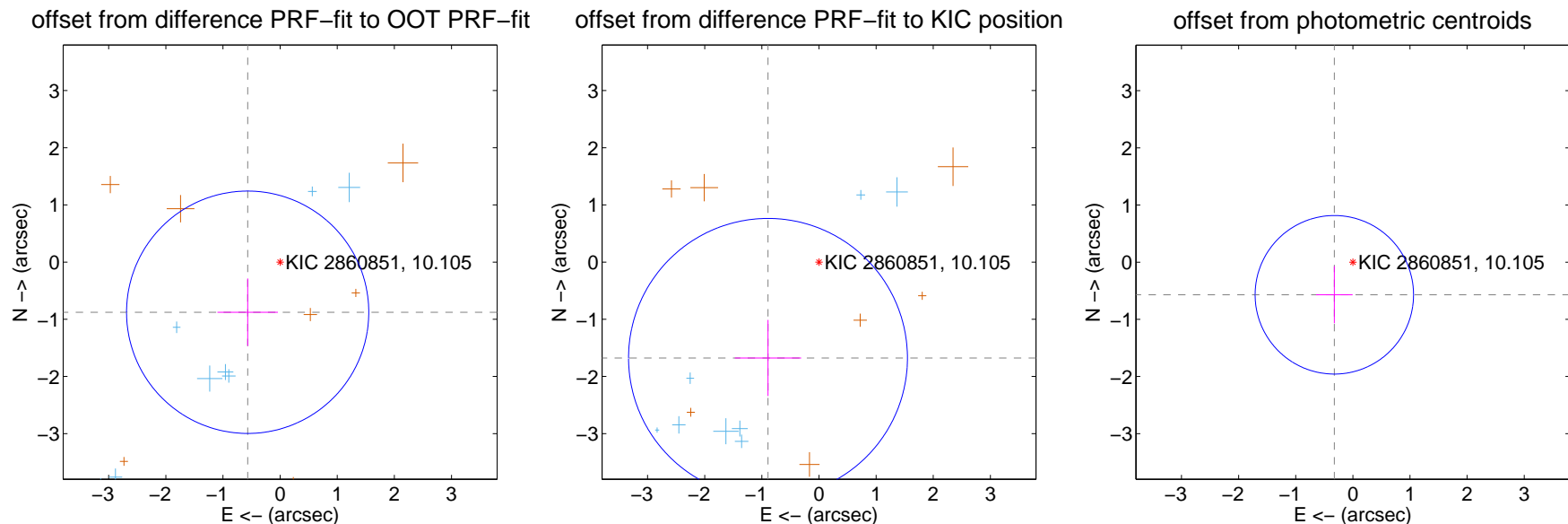
DV Centroid Data

Supplemental centroid analysis for 002860851-03. **Kepler magnitude: 10.11.** Transit SNR 8.44

There are 8 quarters with good PRF difference image offsets

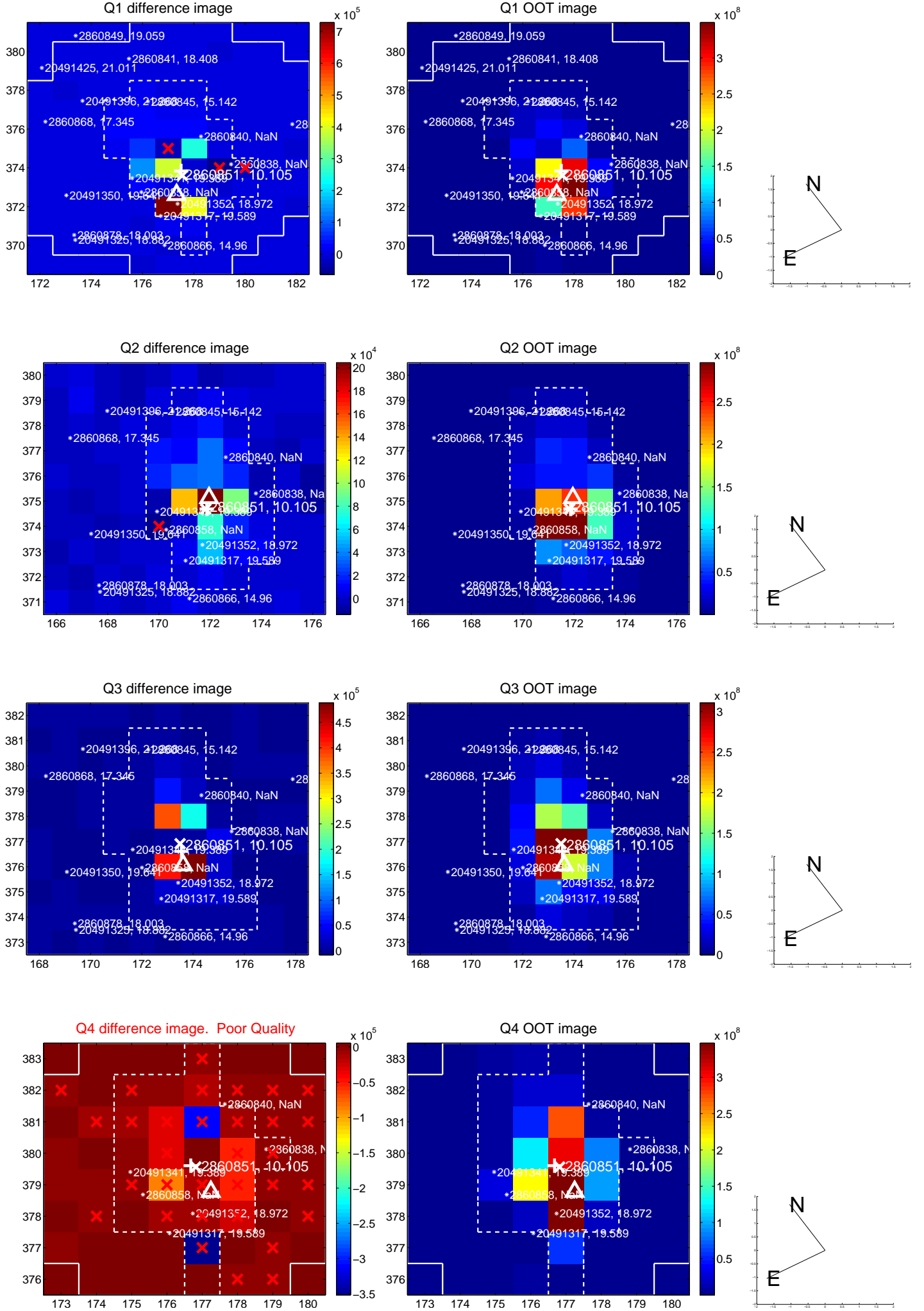
The direct PRF centroid is offset from the target star catalog position by about 0.49 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.045 ± 0.706	1.48	0.568 ± 0.529	-0.877 ± 0.591
PRF-fit source offset from KIC position	1.900 ± 0.813	2.34	0.892 ± 0.580	-1.677 ± 0.666
photometric centroid source offset	0.66 ± 0.46	1.42	0.32 ± 0.32	-0.57 ± 0.50

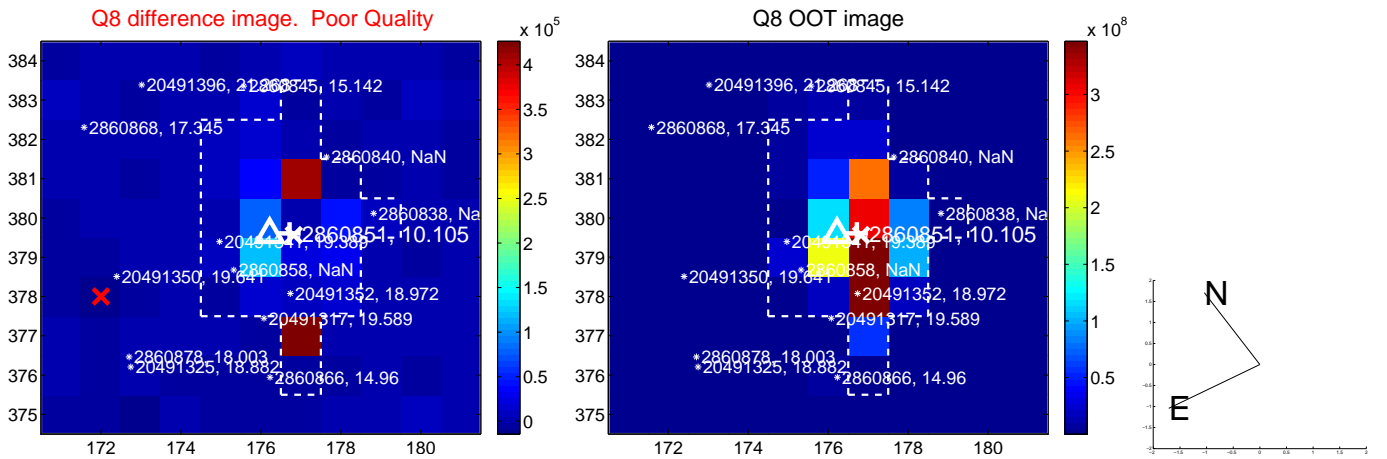
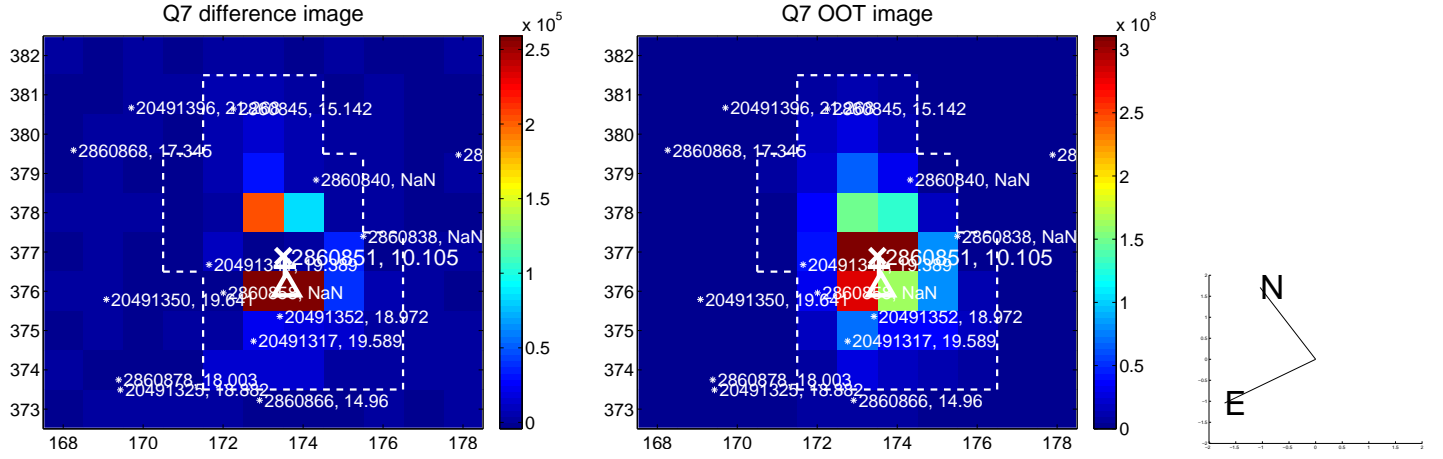
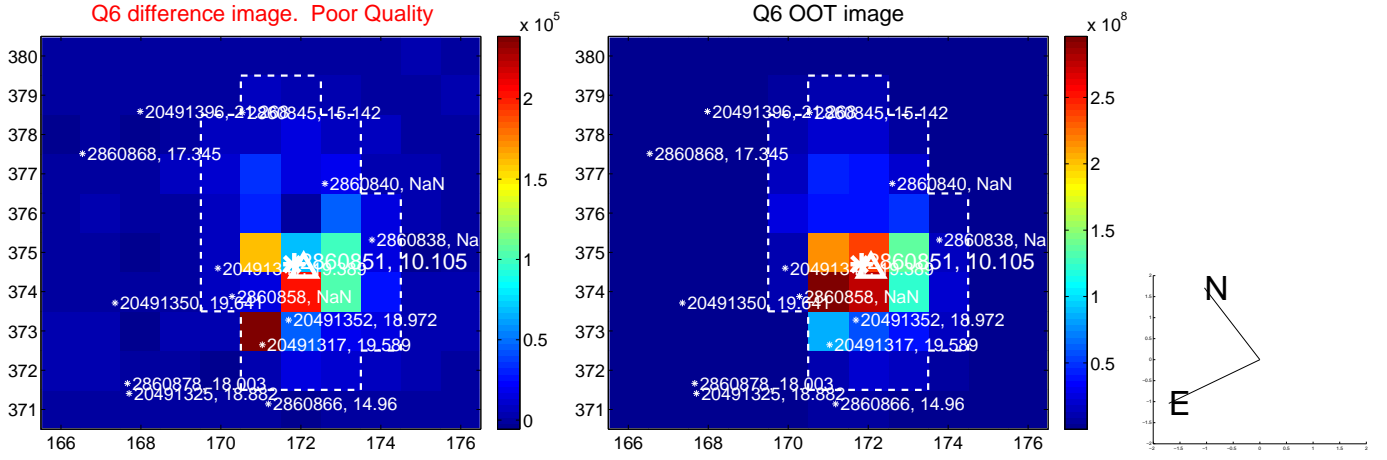
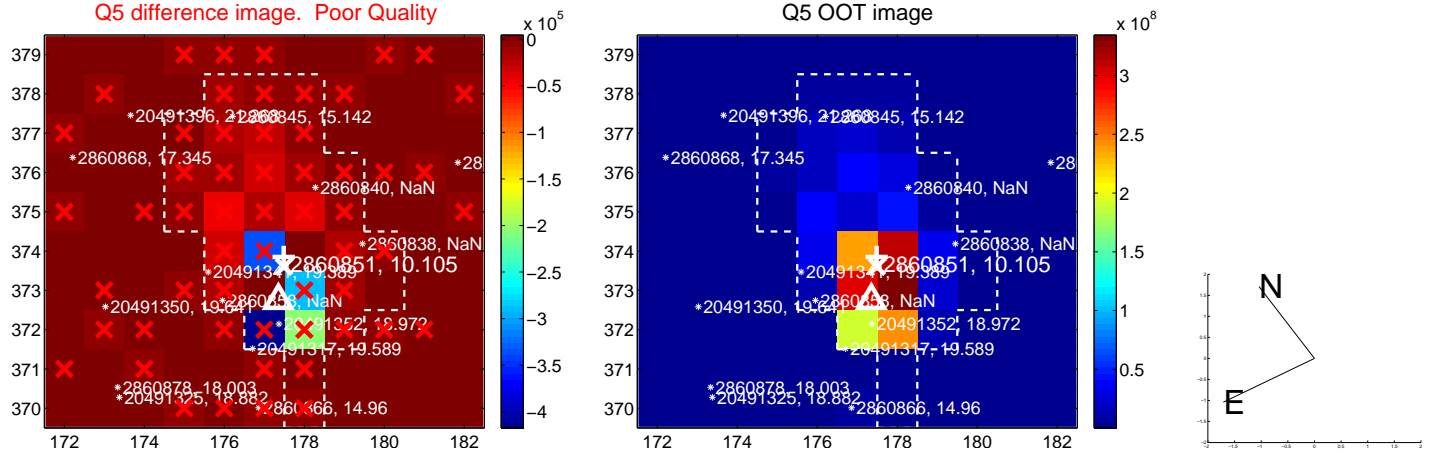


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

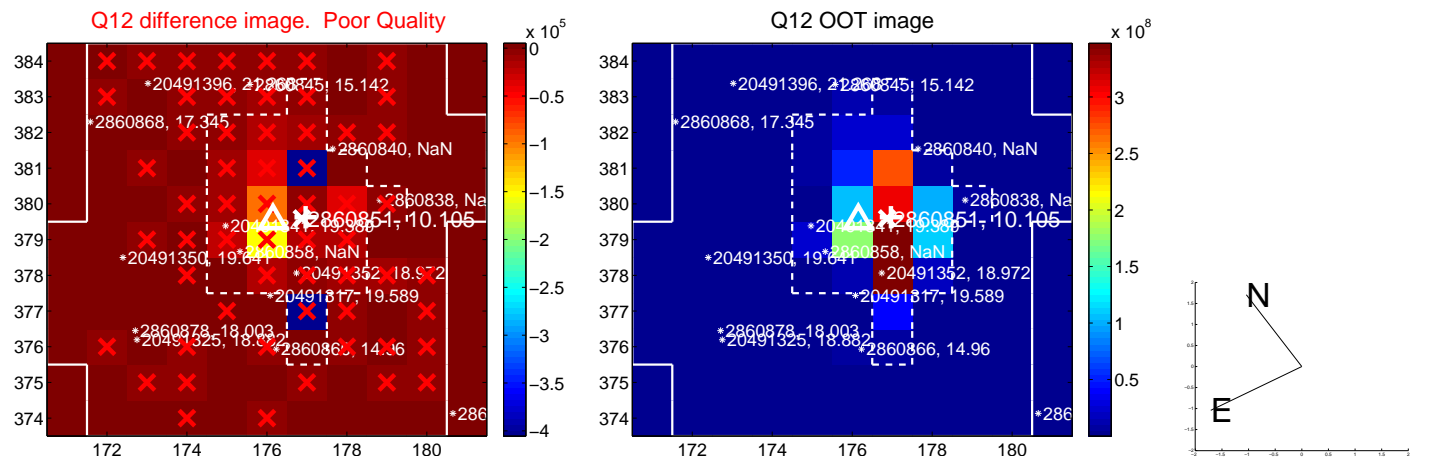
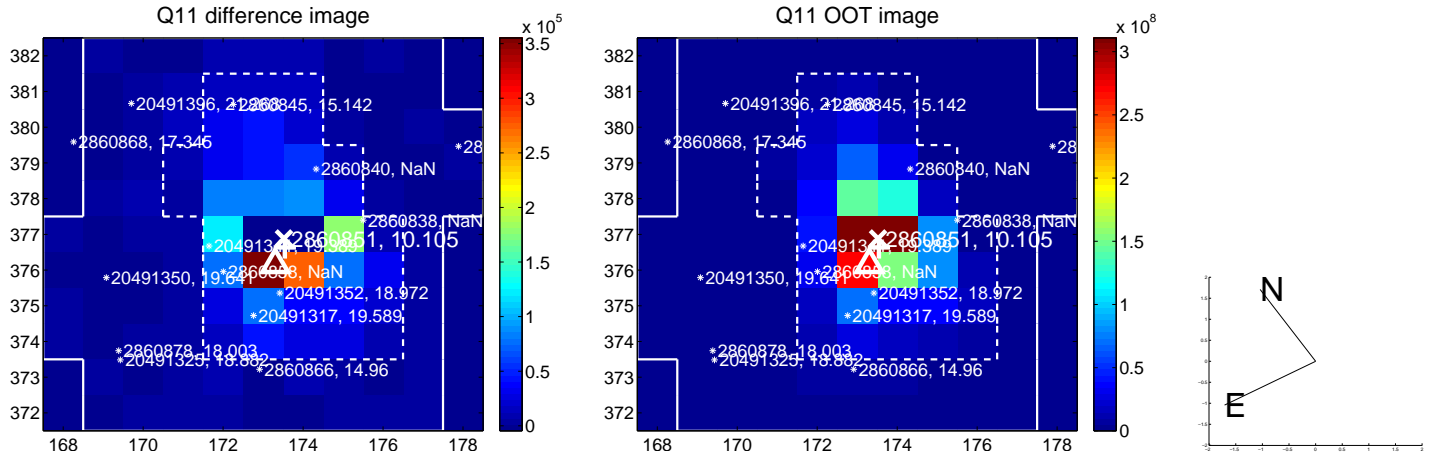
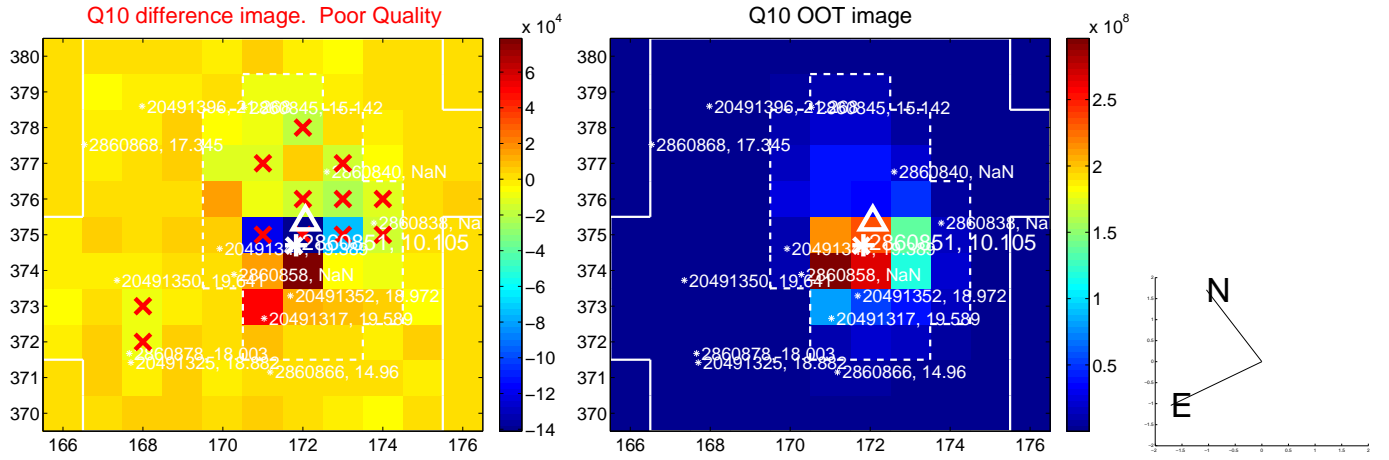
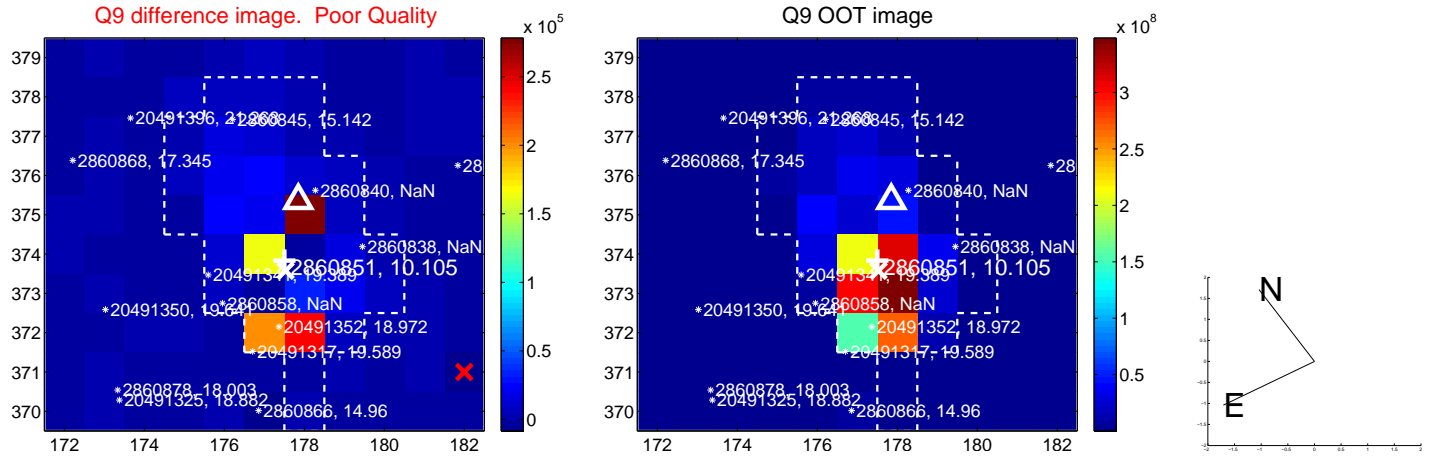
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



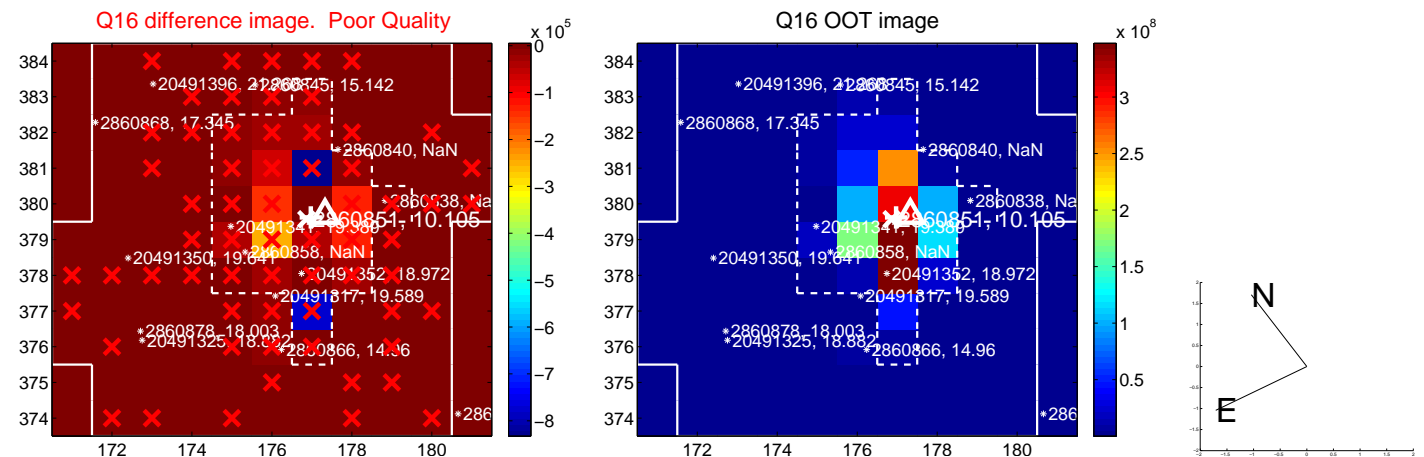
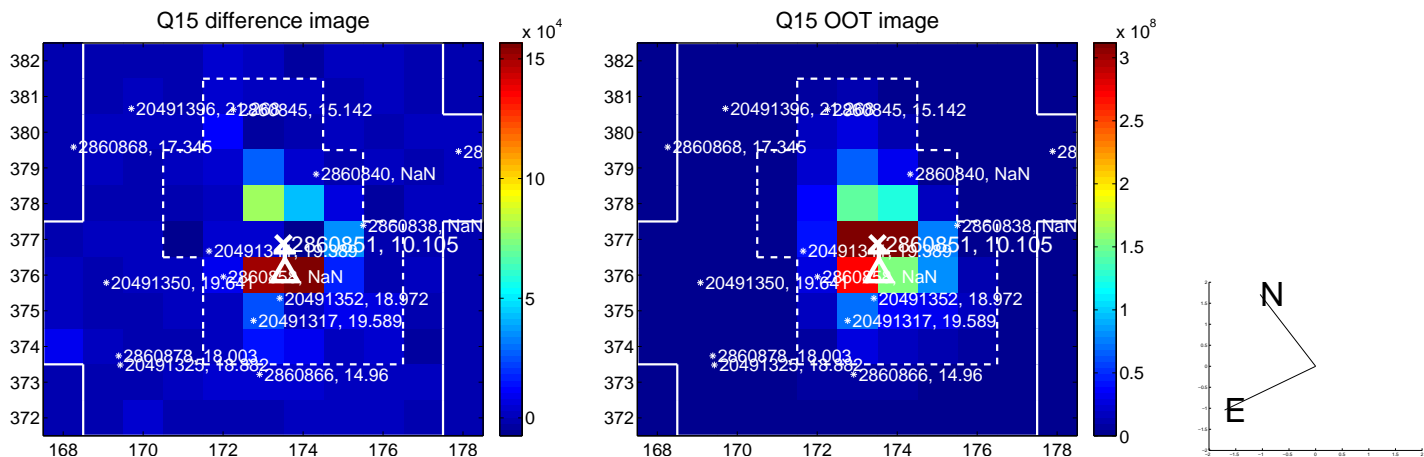
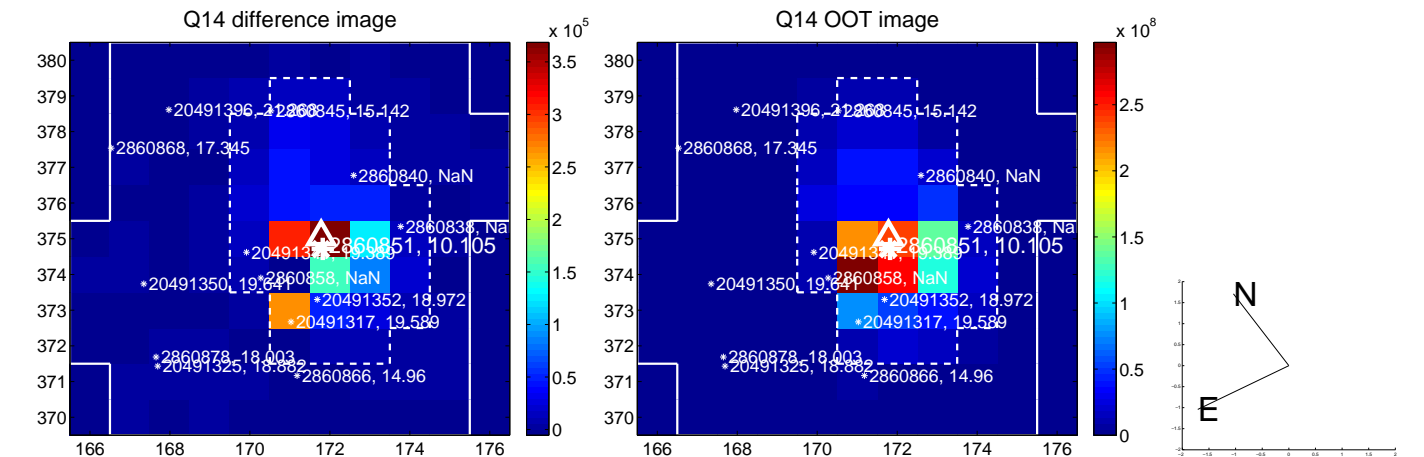
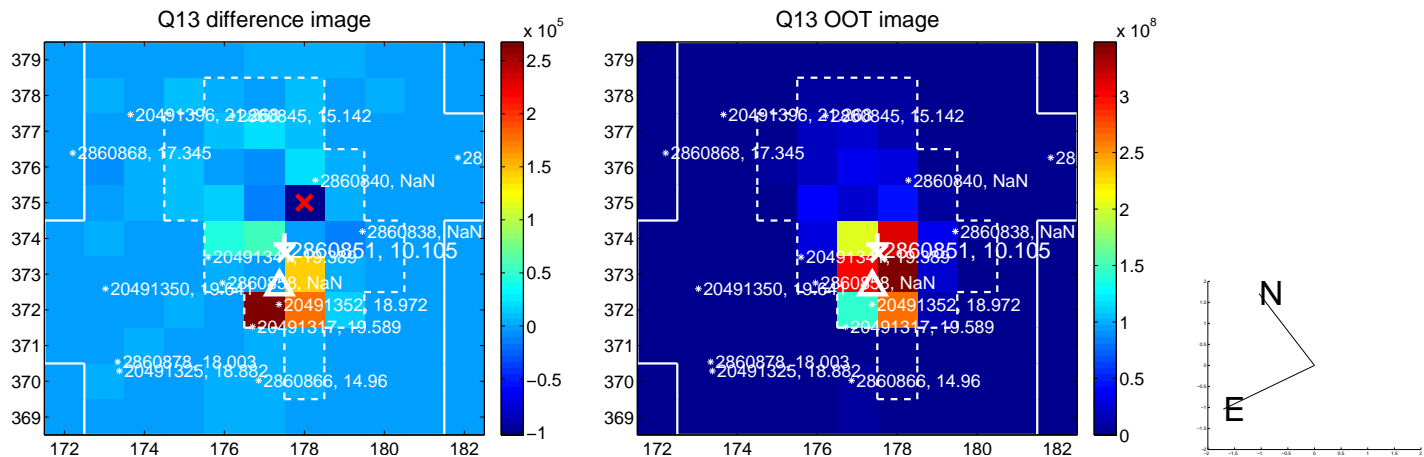
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



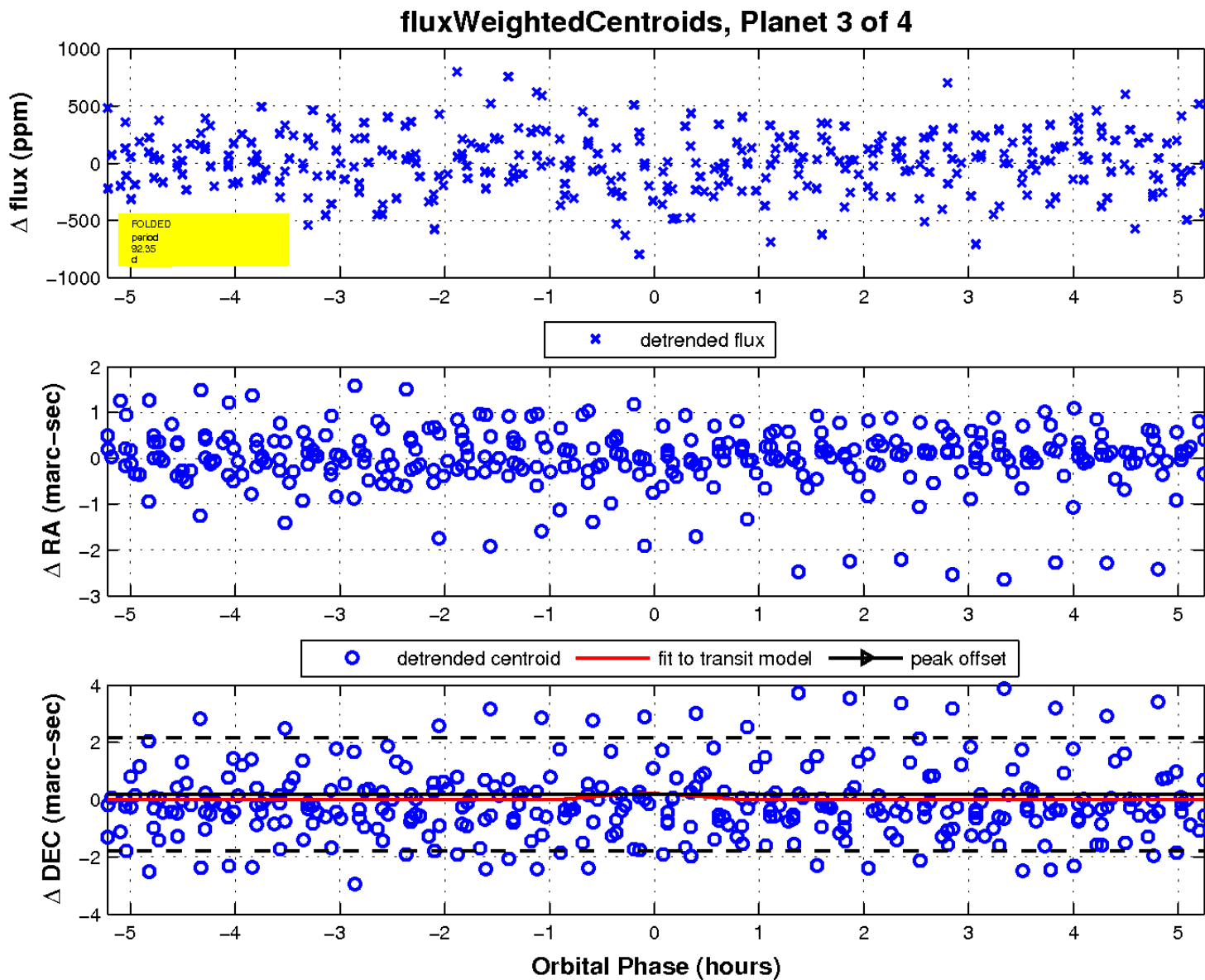
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

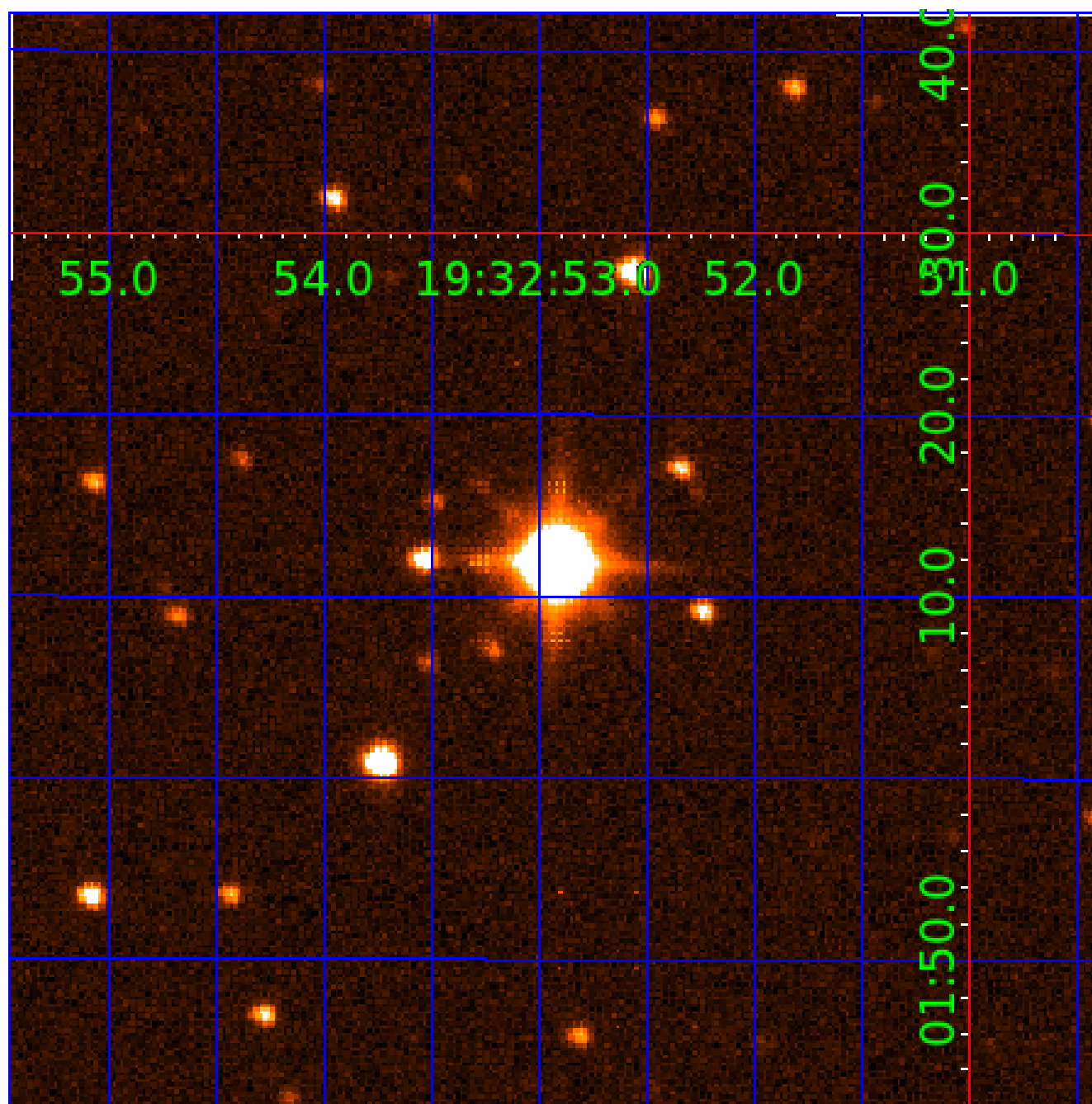


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 002860851

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})
002860851-01	OBS	No	1.196773	132.011602	42.1	6.790	11.9	13.8	2.83	8902	1.87	59131.00
002860851-02	OBS	No	69.282777	161.361756	489.5	2.230	9.4	9.2	2.83	8902	6.99	264.04
002860851-03	OBS	No	92.352446	142.271992	498.9	1.752	8.9	8.4	2.83	8902	11.89	179.98
002860851-04	OBS	No	65.098318	145.699157	361.1	1.847	9.2	9.2	2.83	8902	6.29	286.90

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002860851-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—CENT_SATURATED
002860851-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
002860851-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
002860851-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

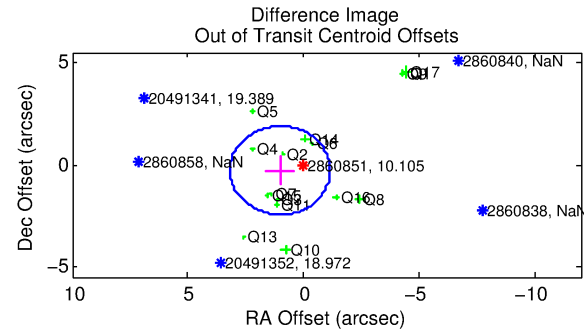
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

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

Ephemeris Match Information For 002860851-04

No Significant Match Found

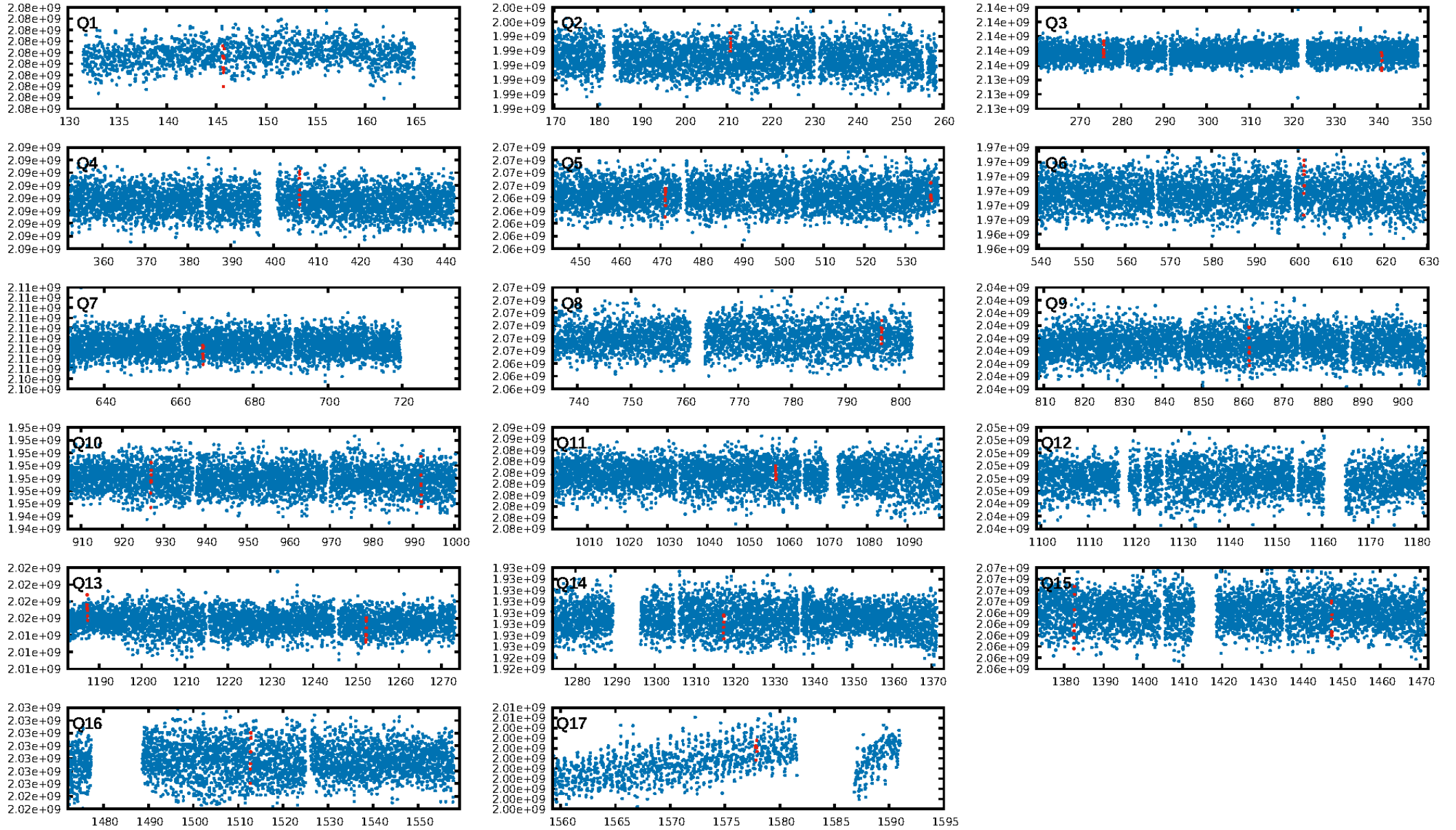
KIC: 2860851 Candidate: 4 of 4 Period: 65.098 d



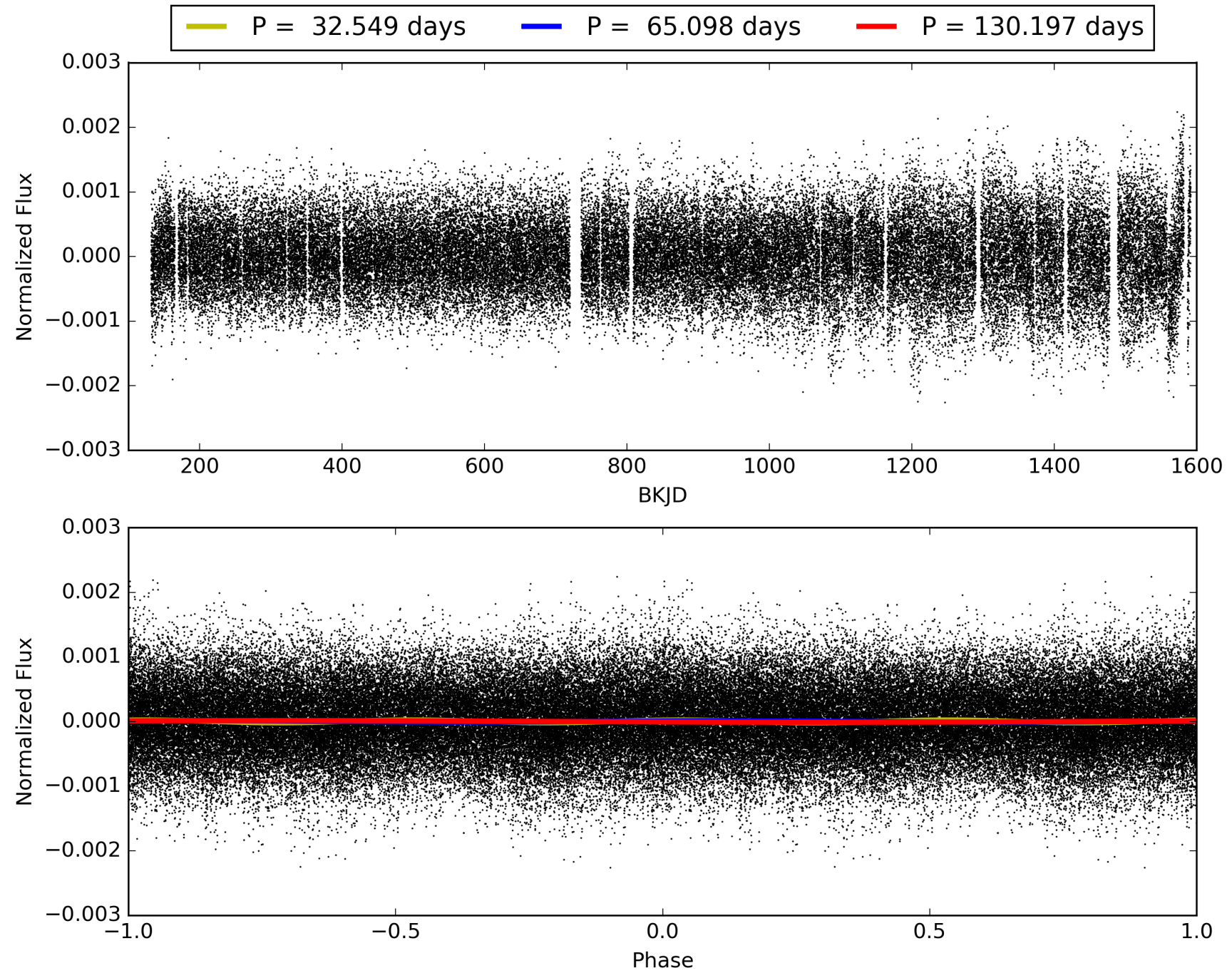
Centroid-sig: N/A
Centroid-so: 0.238 arcsec [0.60σ]
OotOffset-rm: 1.050 arcsec [1.45σ]
KicOffset-rm: 1.230 arcsec [1.63σ]
OotOffset-st: 4/4/3/5 [16]
KicOffset-st: 4/4/3/5 [16]
DiffImageQuality-fgm: 0.44 [7/16]
DiffImageOverlap-fno: 0.50 [8/16]

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

TCE 002860851-04, PDC Light Curves

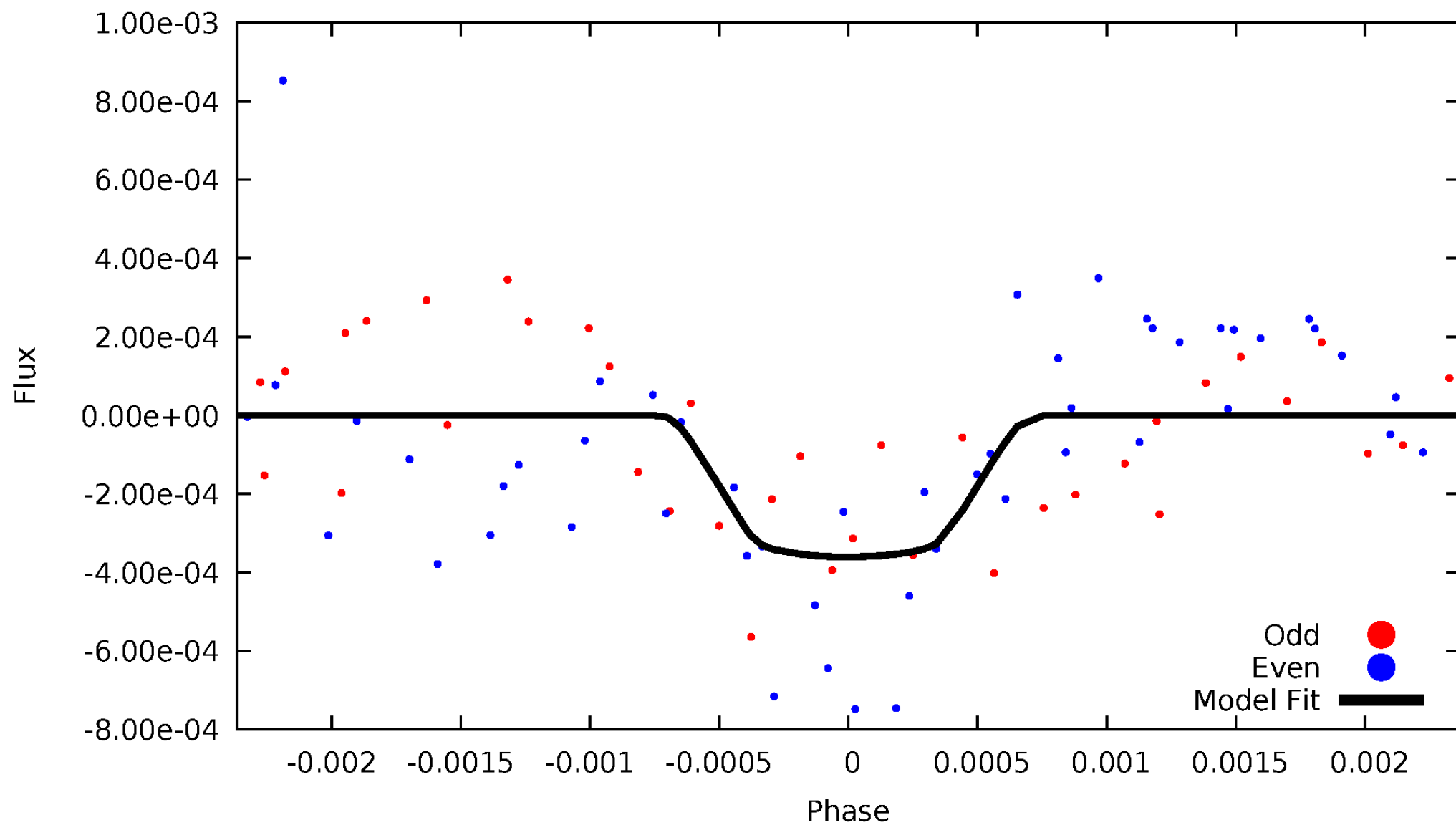


TCE 002860851-04



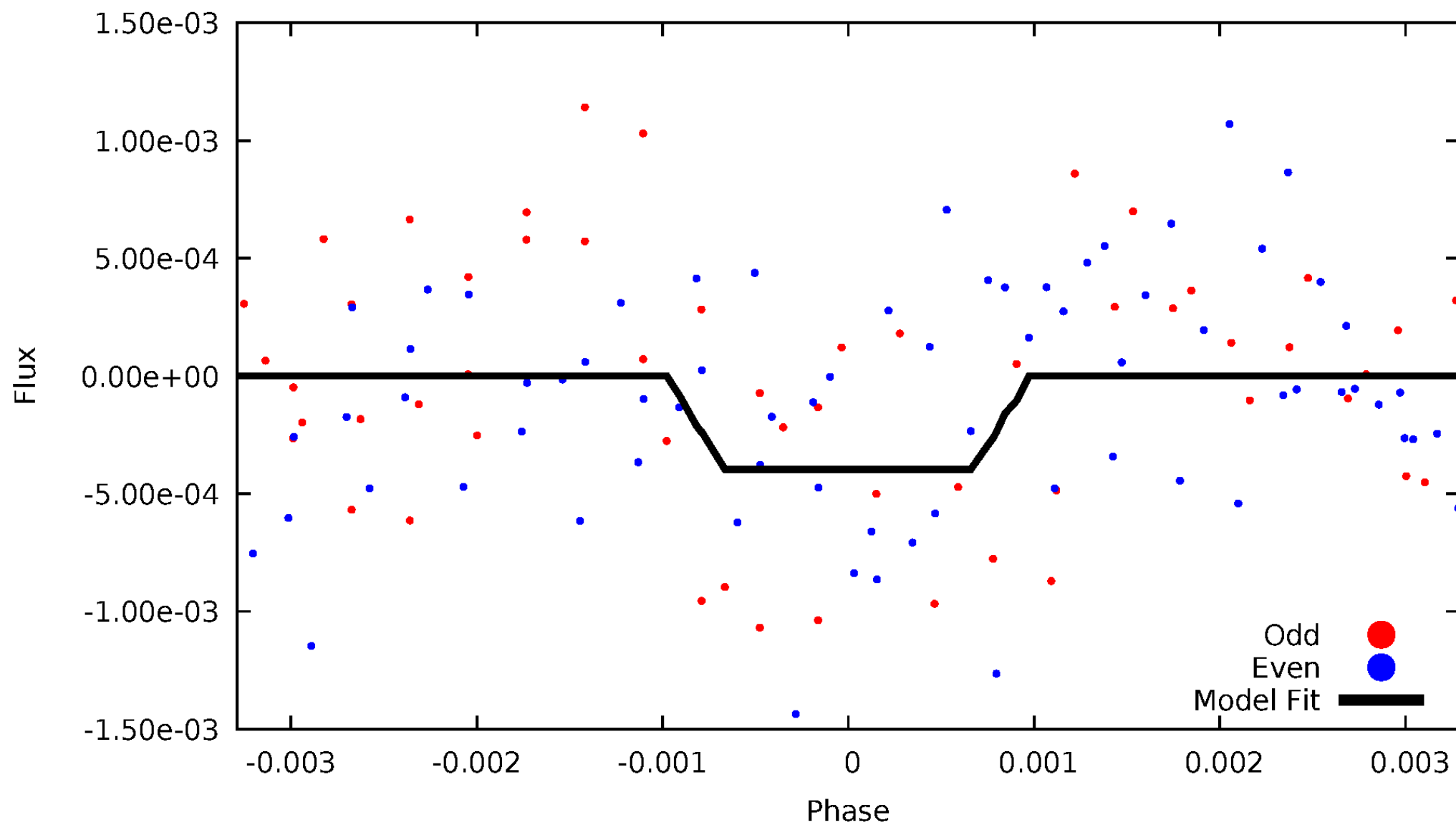
DV Odd/Even

TCE 002860851-04



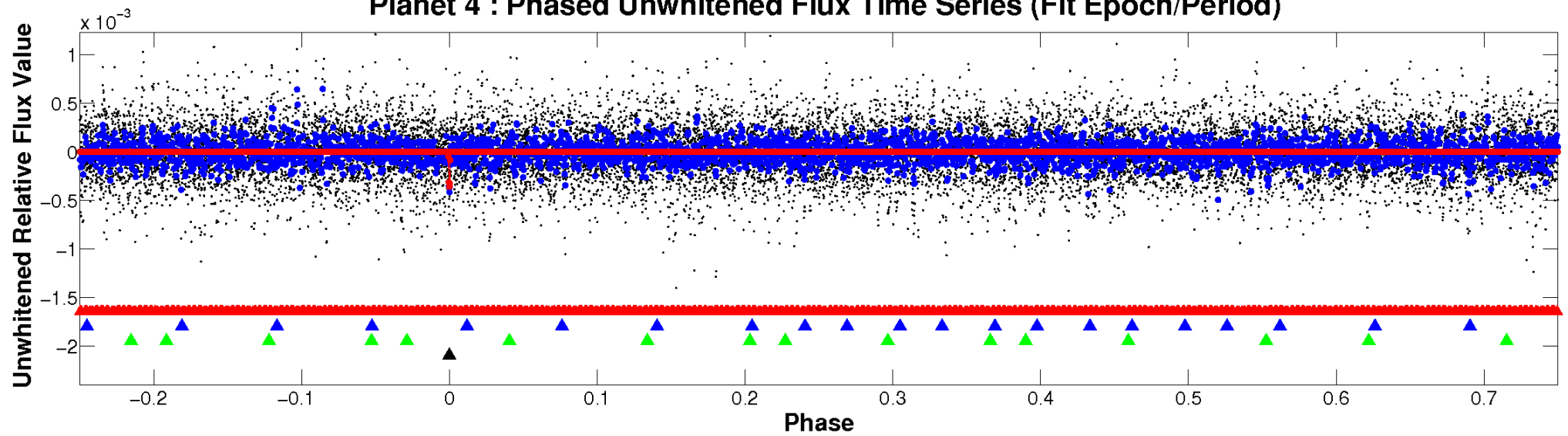
ALT Odd/Even

TCE 002860851-04

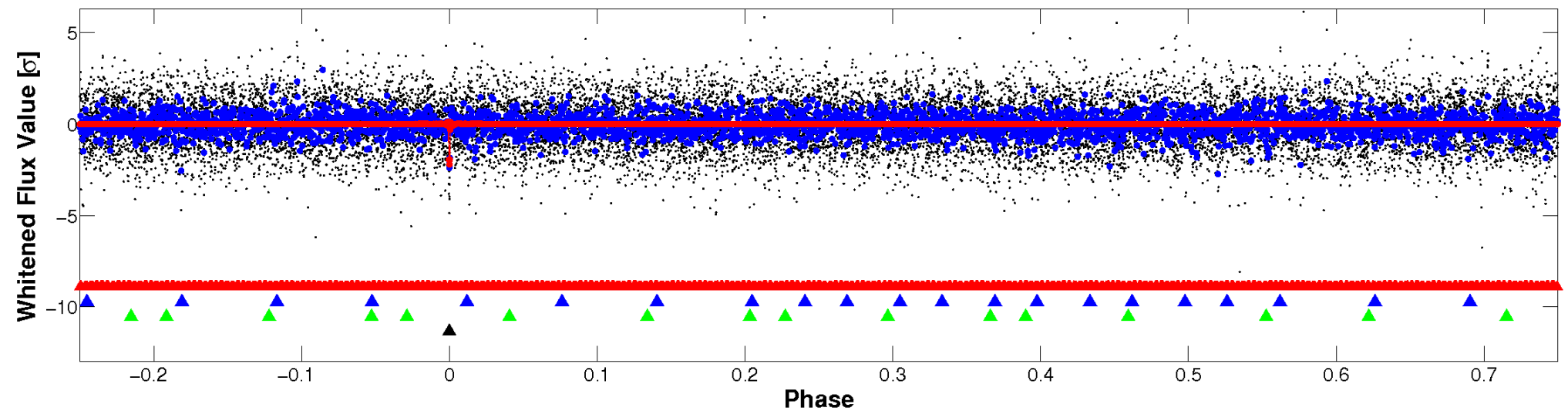


Non-Whitened Vs. Whitened Light Curve

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

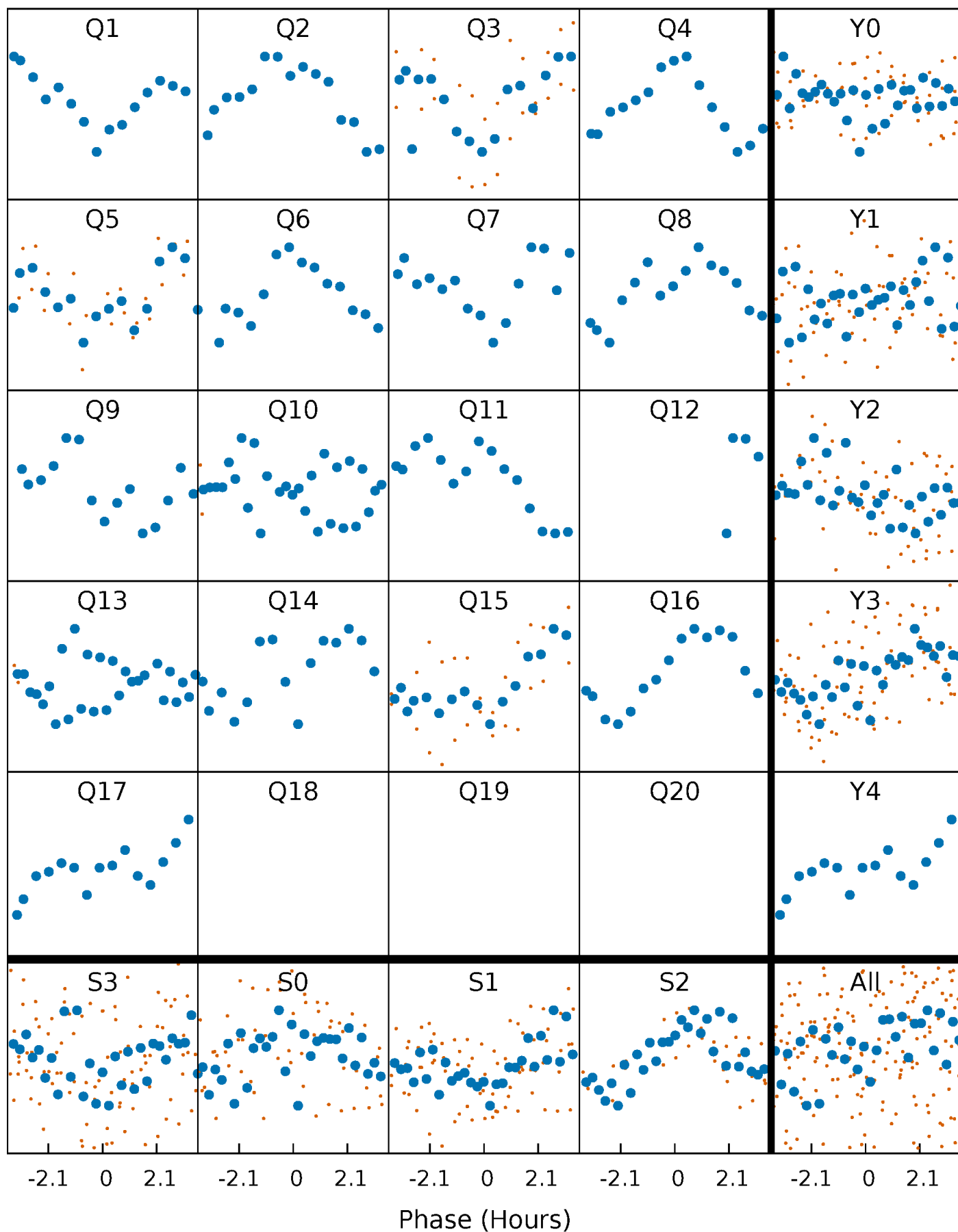


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



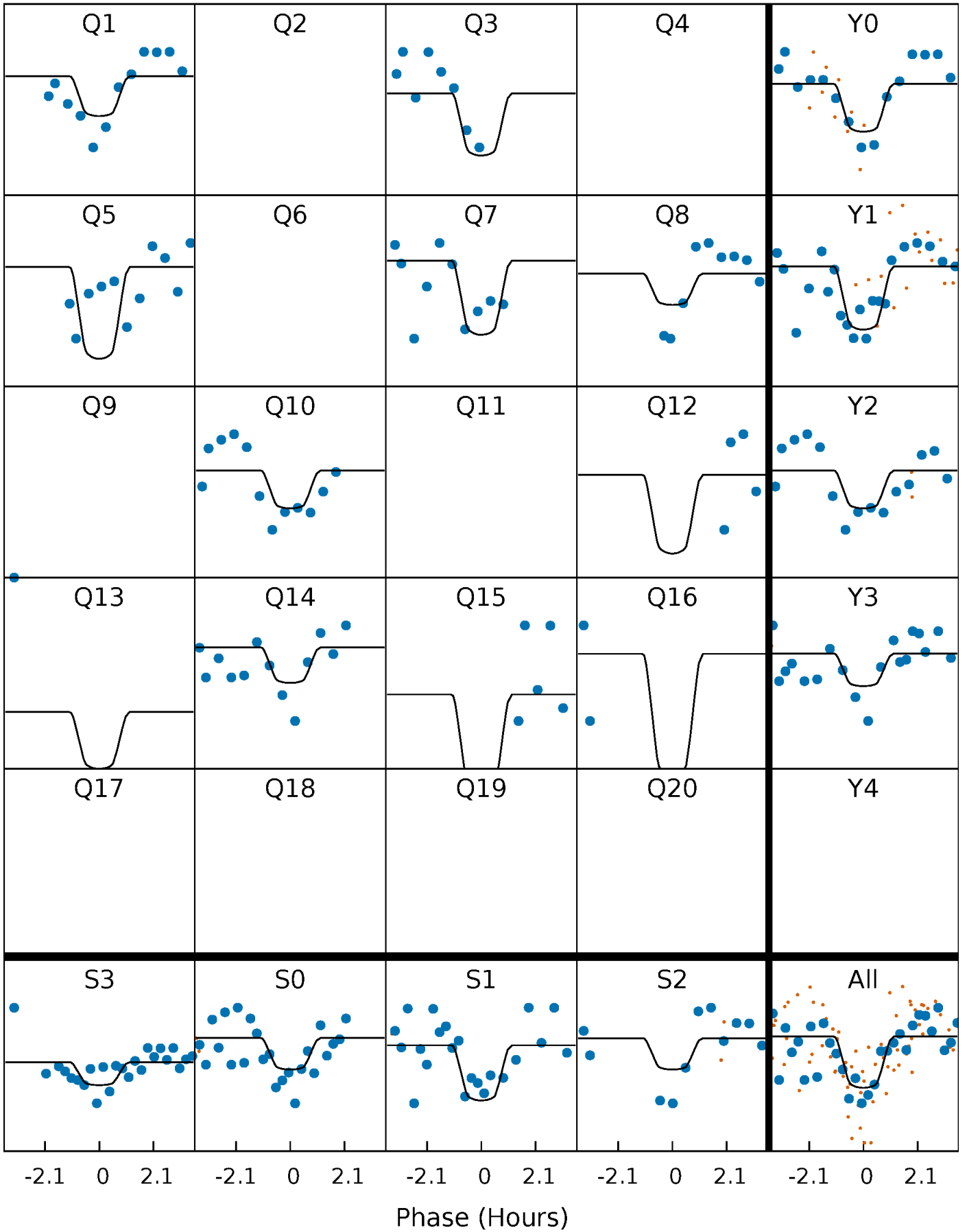
PDC Quarter-Phased Transit Curves

TCE 002860851-04 P= 65.098318 Days $T_0=145.699157$ (BKJD)



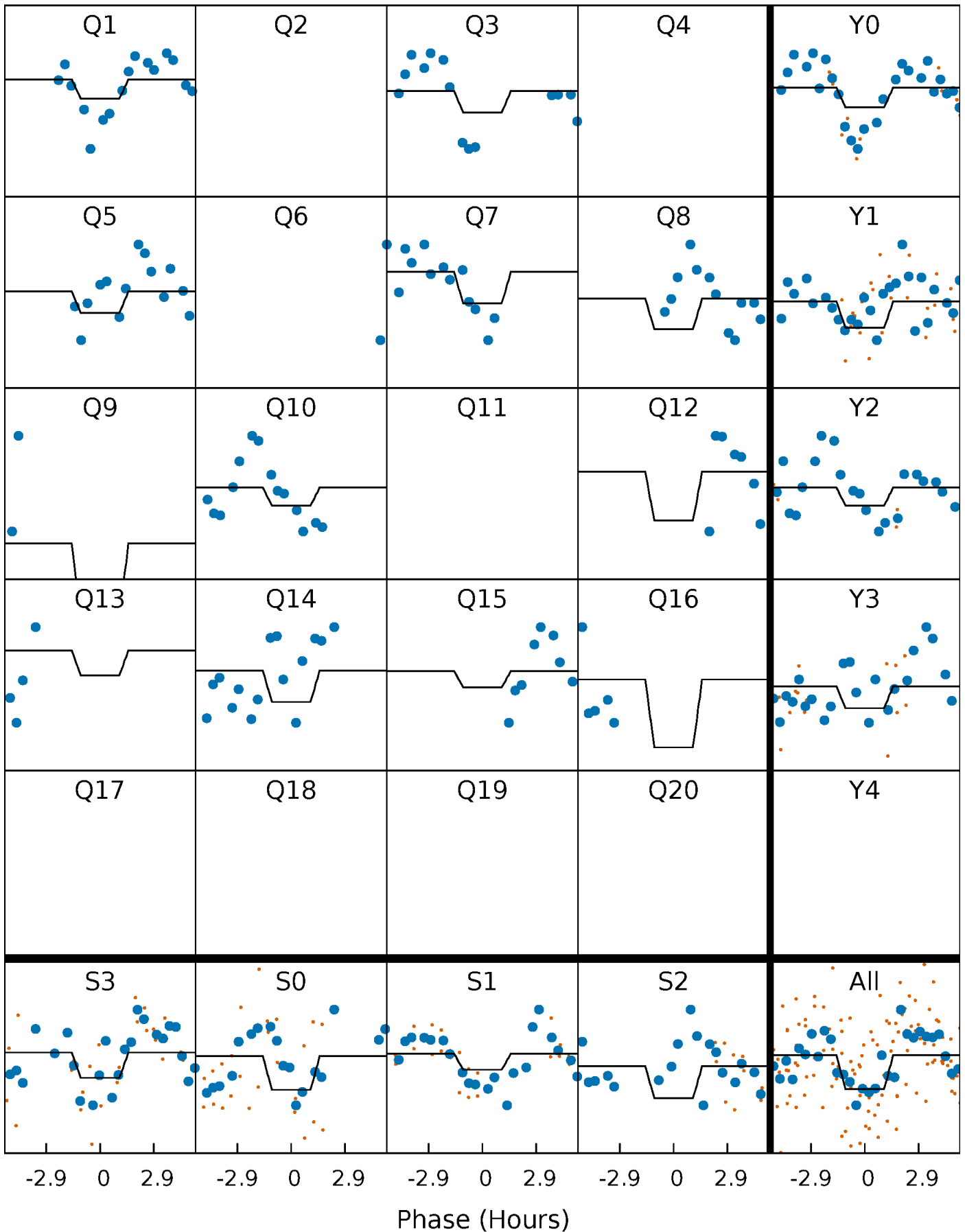
DV Quarter-Phased Transit Curves

TCE 002860851-04 P= 65.098318 Days $T_0=145.699157$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

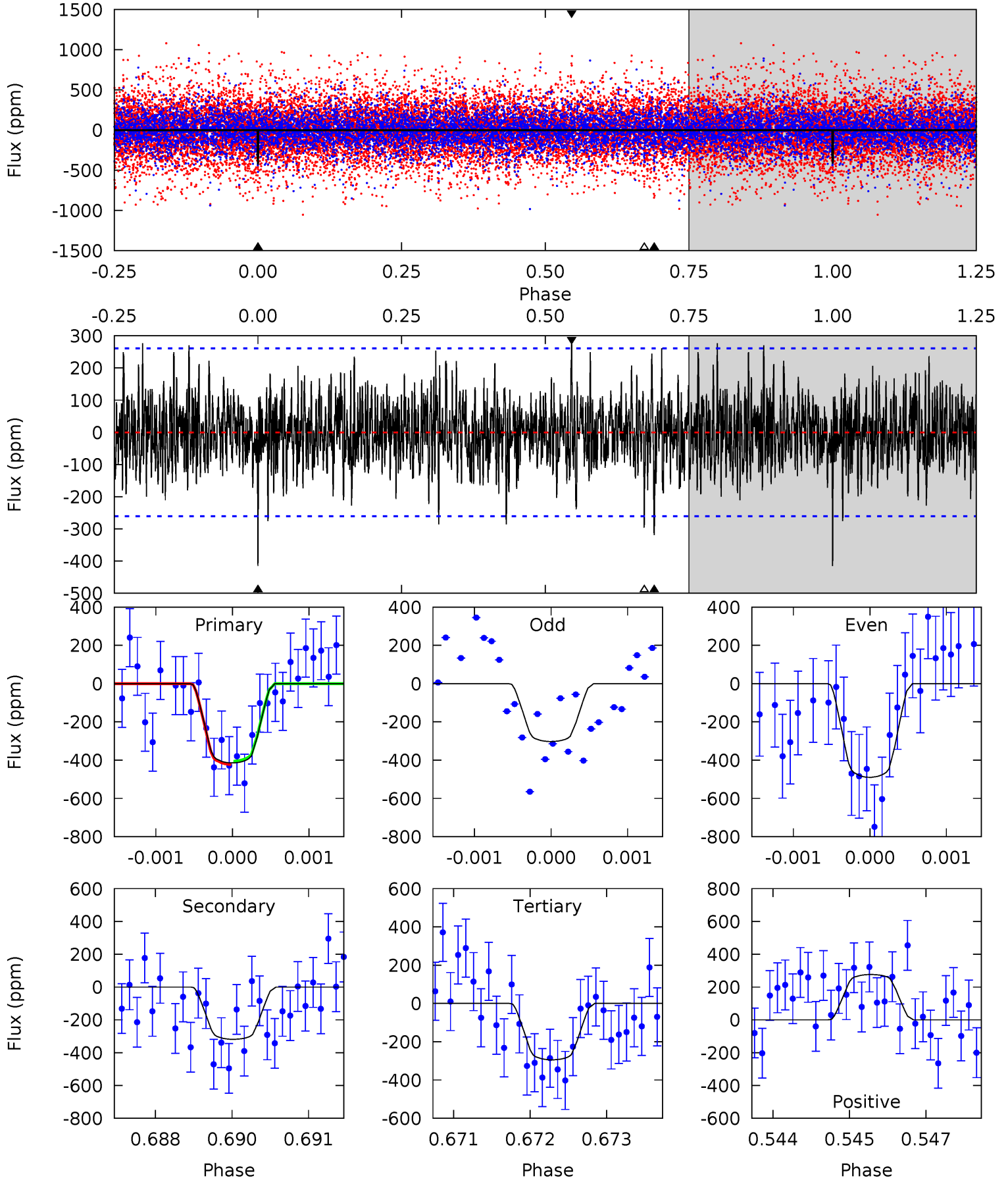
TCE 002860851-04 $P = 65.097794$ Days $T_0 = 145.712500$ (BKJD)



DV Model-Shift Uniqueness Test

002860851-04, P = 65.098318 Days, E = 80.600839 Days

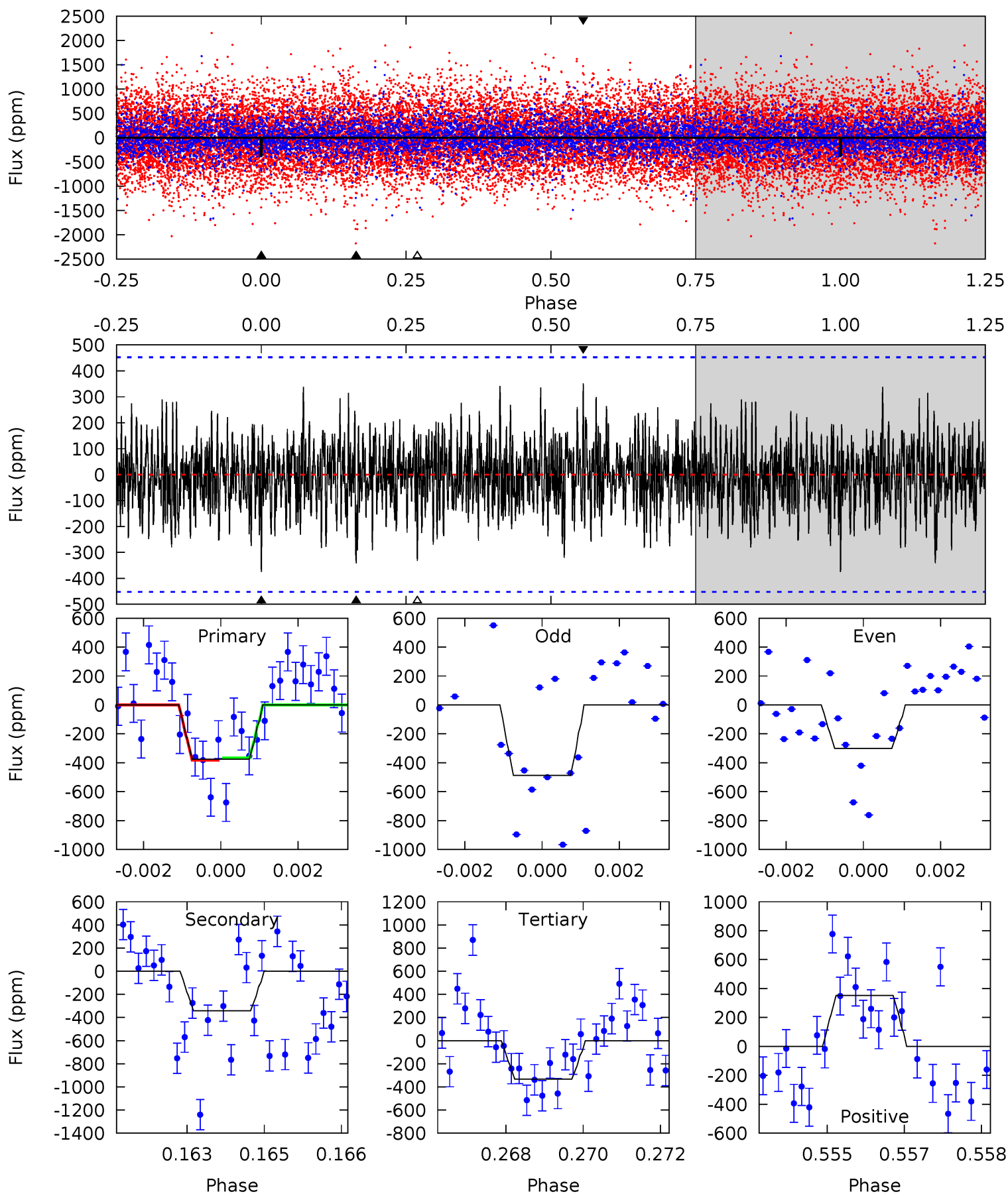
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.58	6.59	6.10	5.72	5.40	3.20	1.70	2.48	2.86	0.50	0.87	1.92	0.83	0.40	0.18



Alt Model-Shift Uniqueness Test

002860851-04, P = 65.097794 Days, E = 80.614706 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.43	4.04	3.93	4.15	5.35	3.12	1.25	0.50	0.28	0.11	-0.11	1.09	0.95	0.48	0.08



Stellar Parameters For KIC 002860851

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	8902^{+687}_{-687}	$3.826^{+0.384}_{-0.096}$	$-0.340^{+0.150}_{-0.200}$	$2.828^{+0.505}_{-1.179}$	$1.956^{+0.374}_{-0.336}$	$0.122^{+0.392}_{-0.036}$
	+8%/-8%	+10%/-3%	+44%/-59%	+18%/-42%	+19%/-17%	+322%/-30%
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 002860851-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-319 ± 48	$6.00^{+2.86}_{-2.56}$	1423^{+156}_{-147}	8104^{+3775}_{-1619}	763^{+1548}_{-408}
Alt.	-342 ± 85	$5.66^{+2.57}_{-2.39}$	1400^{+167}_{-168}	8349^{+4113}_{-1683}	959^{+1883}_{-554}

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

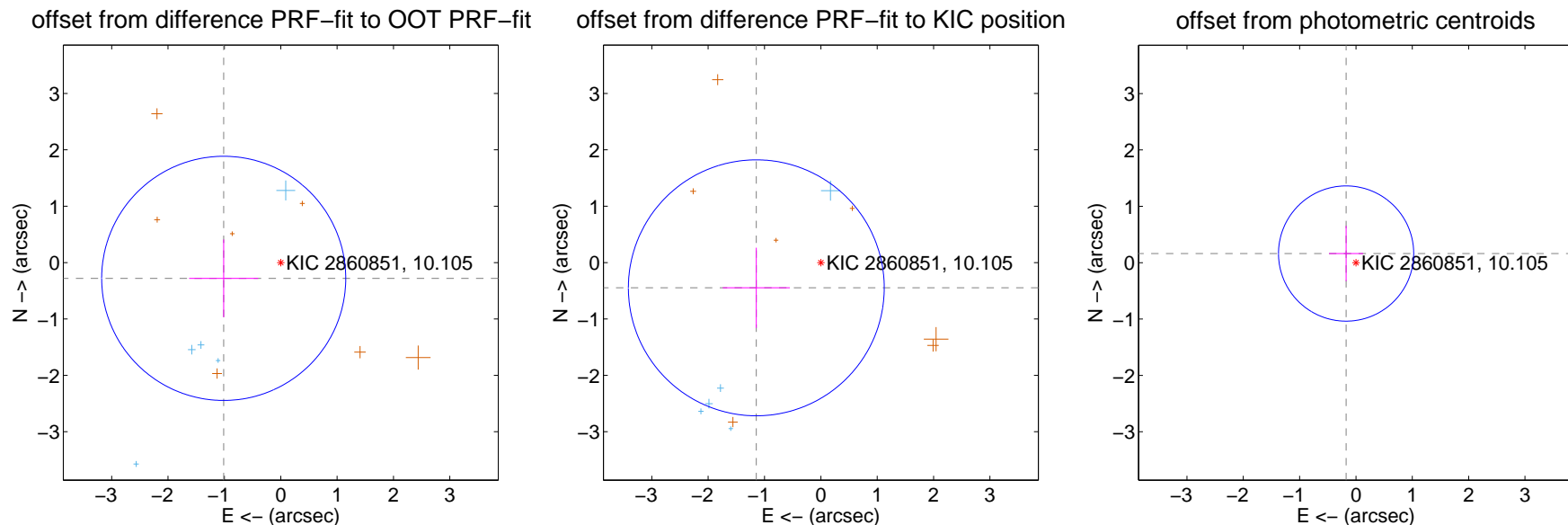
DV Centroid Data

Supplemental centroid analysis for 002860851-04. **Kepler magnitude: 10.11.** Transit SNR 9.16

There are 7 quarters with good PRF difference image offsets

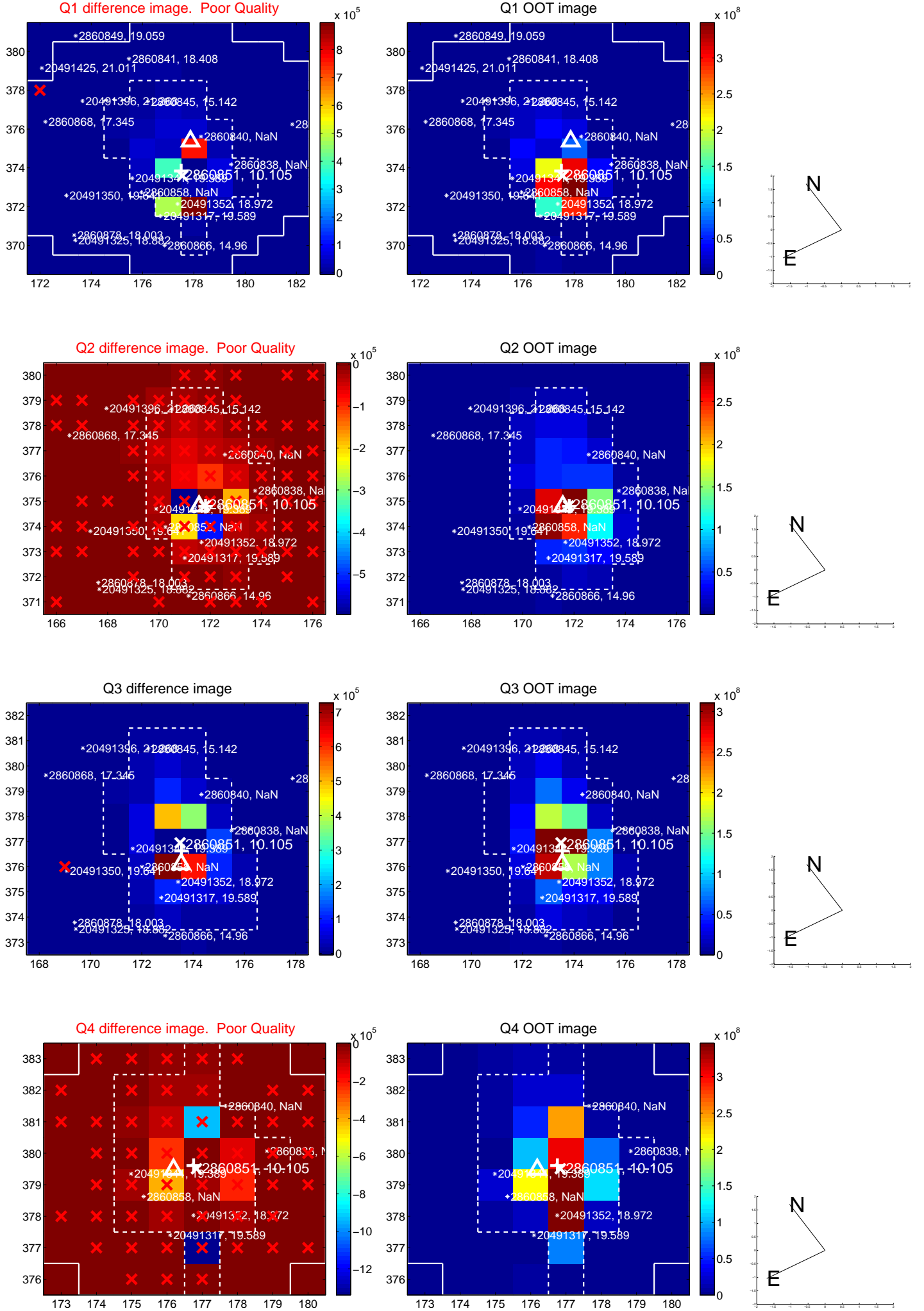
The direct PRF centroid is offset from the target star catalog position by about 0.81 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.050 ± 0.722	1.45	1.012 ± 0.614	-0.280 ± 0.689
PRF-fit source offset from KIC position	1.230 ± 0.757	1.63	1.145 ± 0.595	-0.447 ± 0.712
photometric centroid source offset	0.24 ± 0.40	0.60	0.18 ± 0.30	0.16 ± 0.49

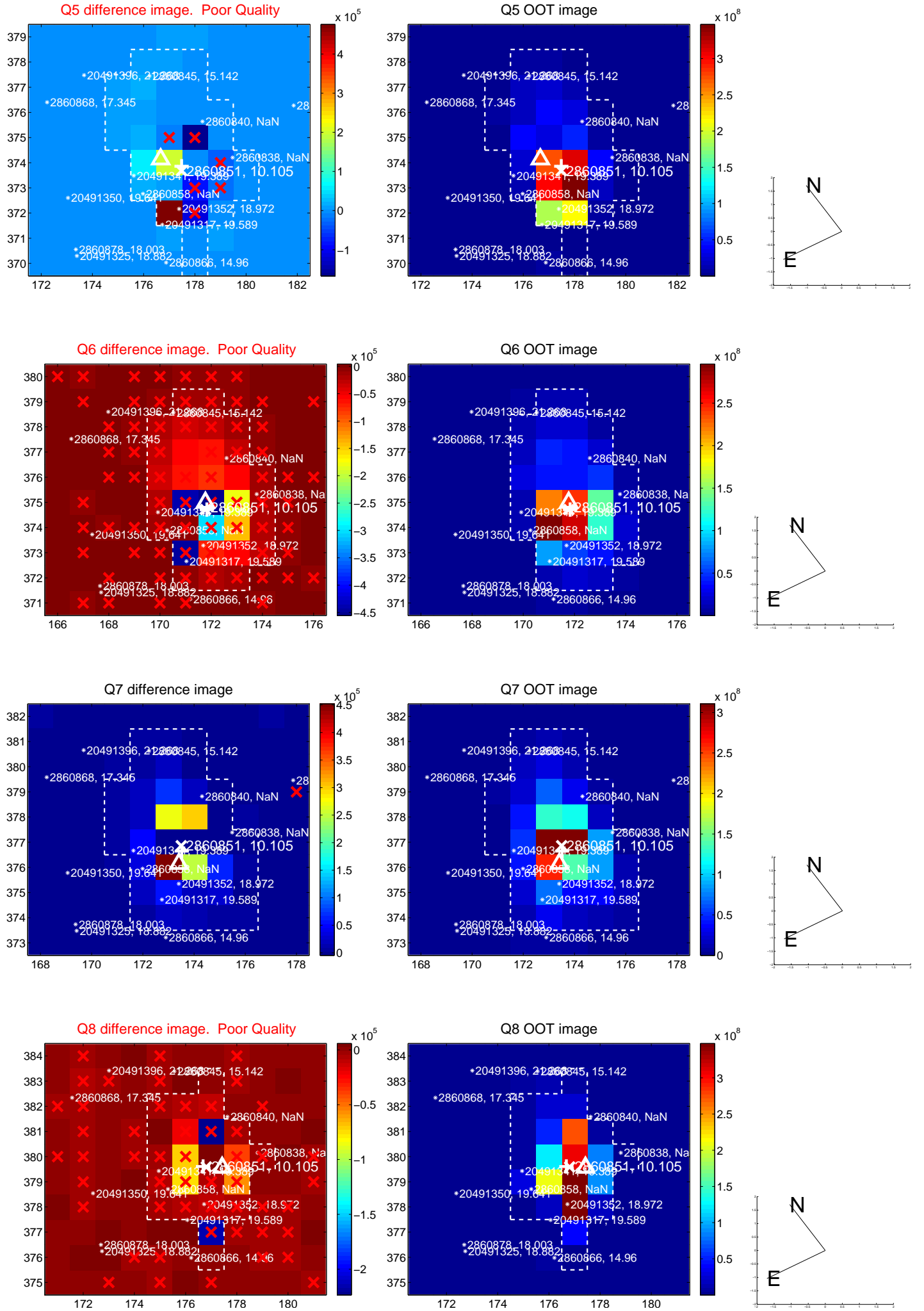


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

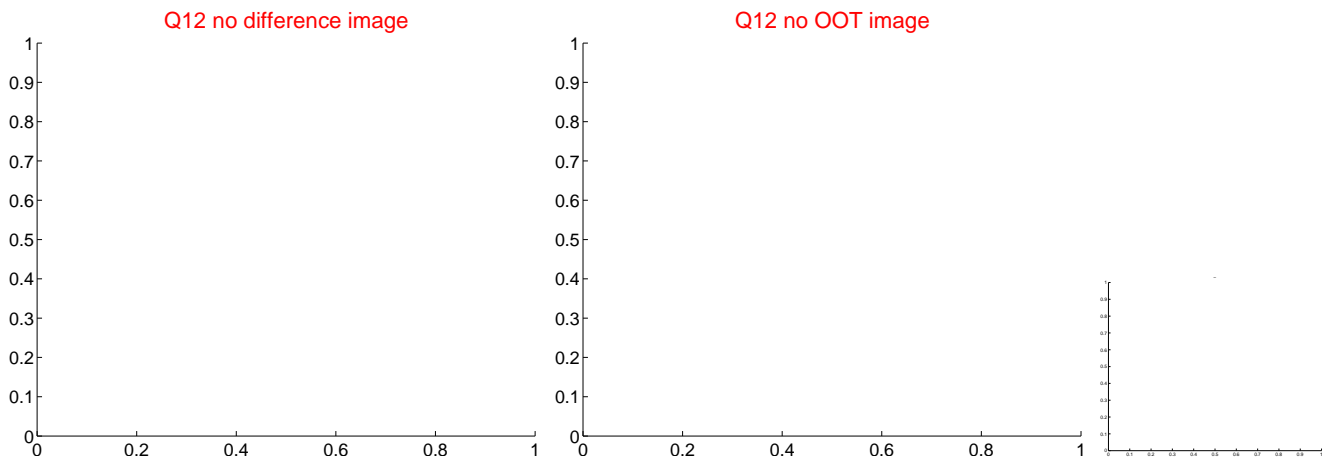
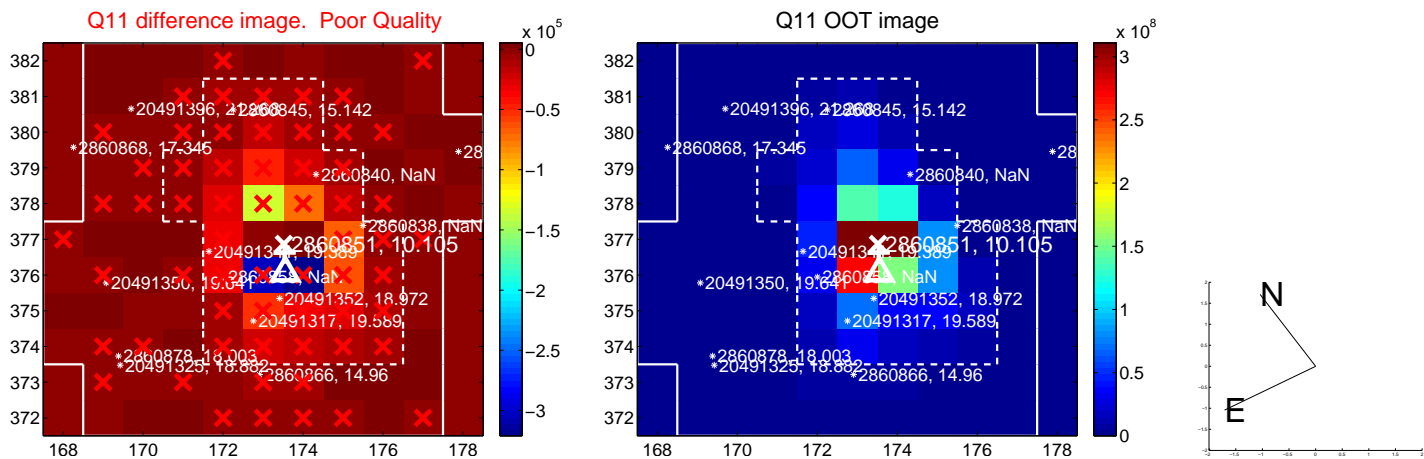
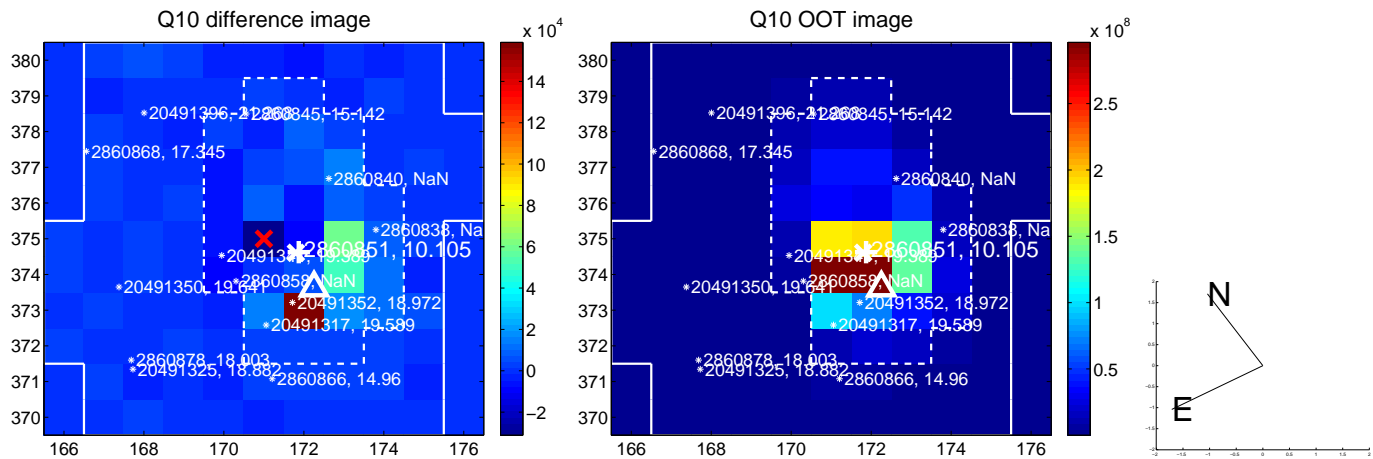
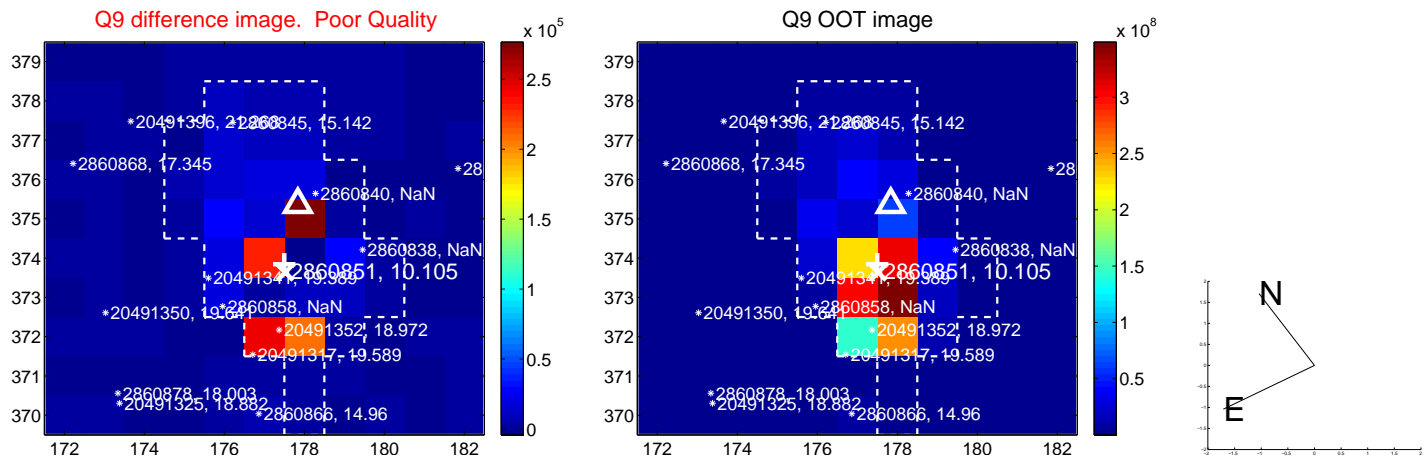
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



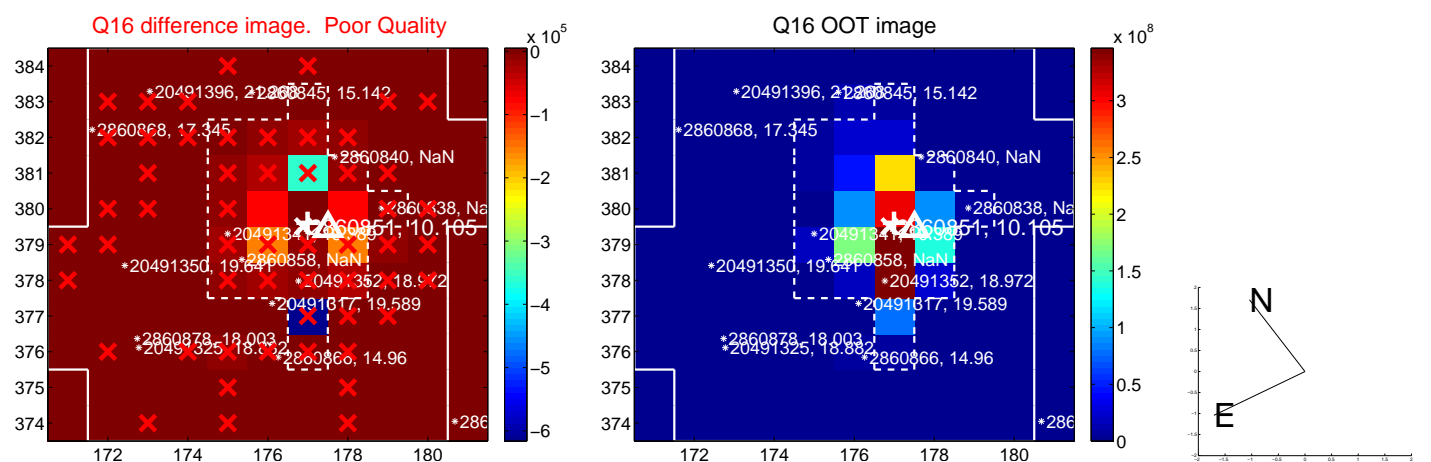
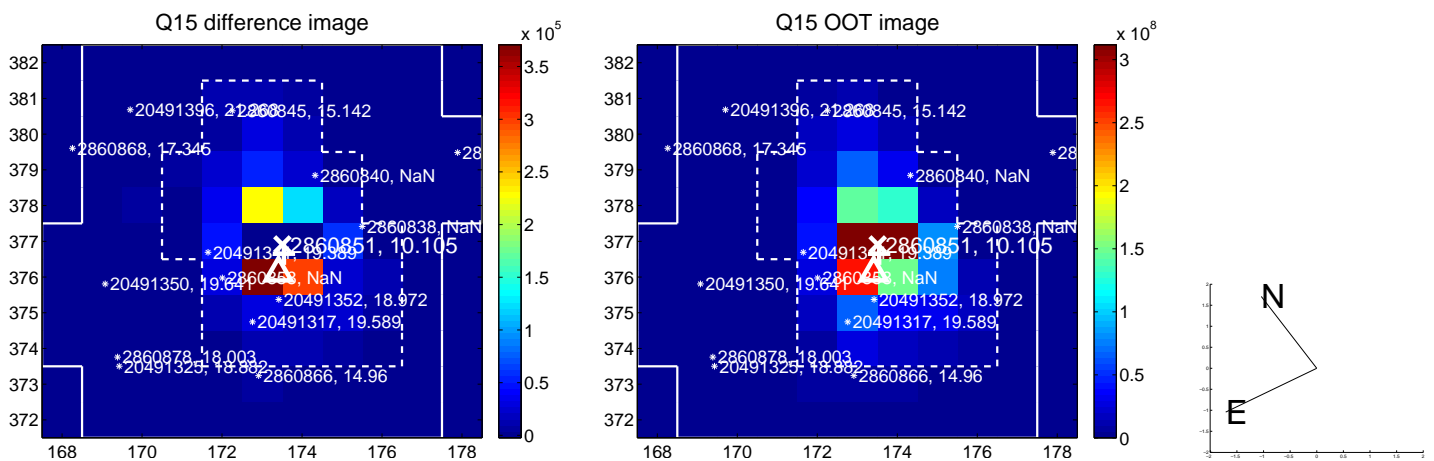
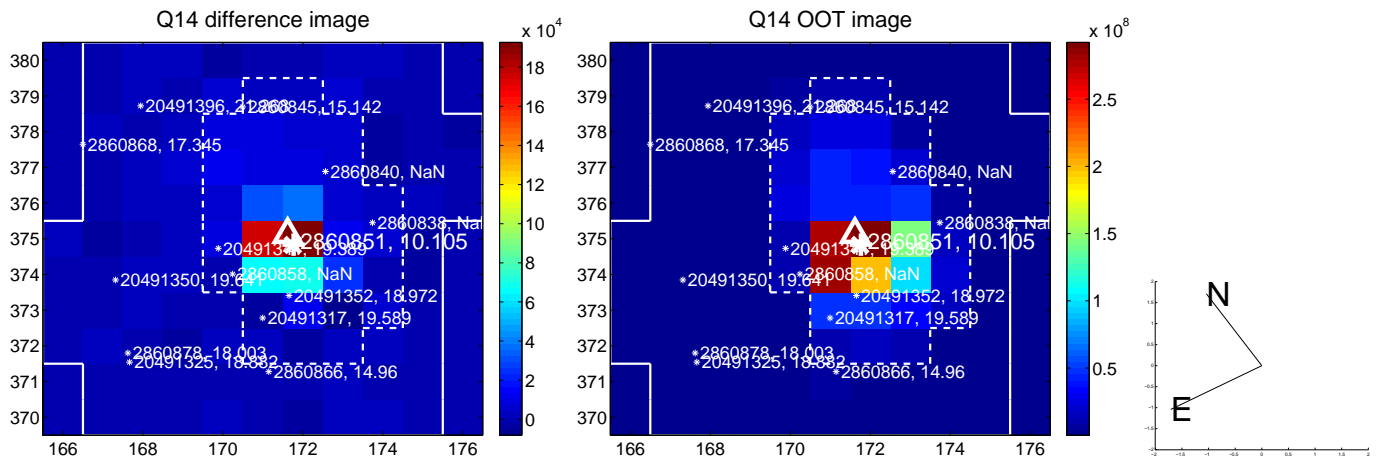
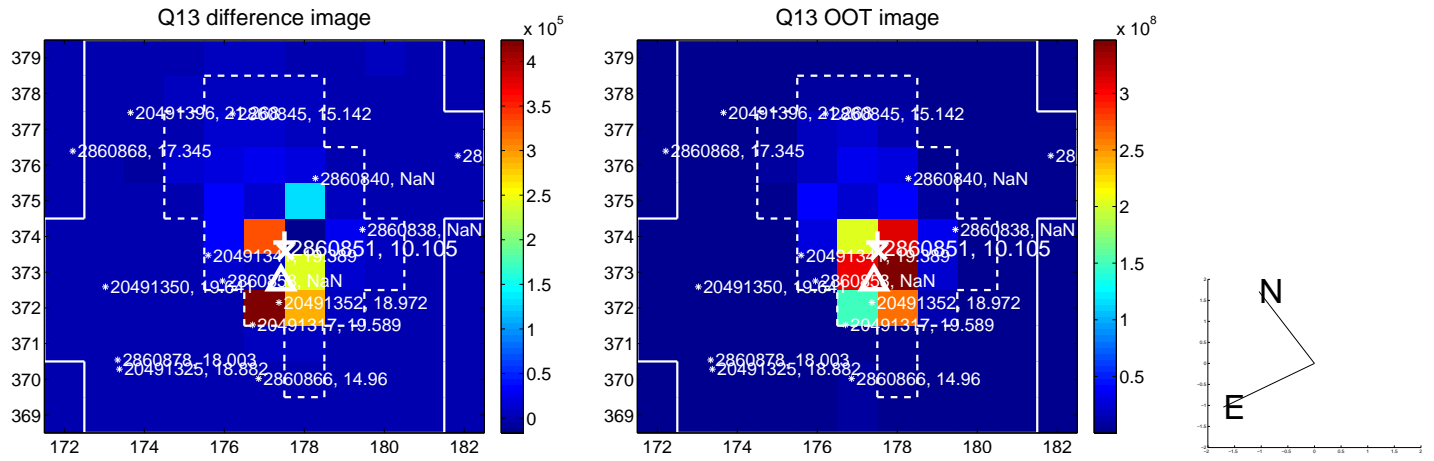
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



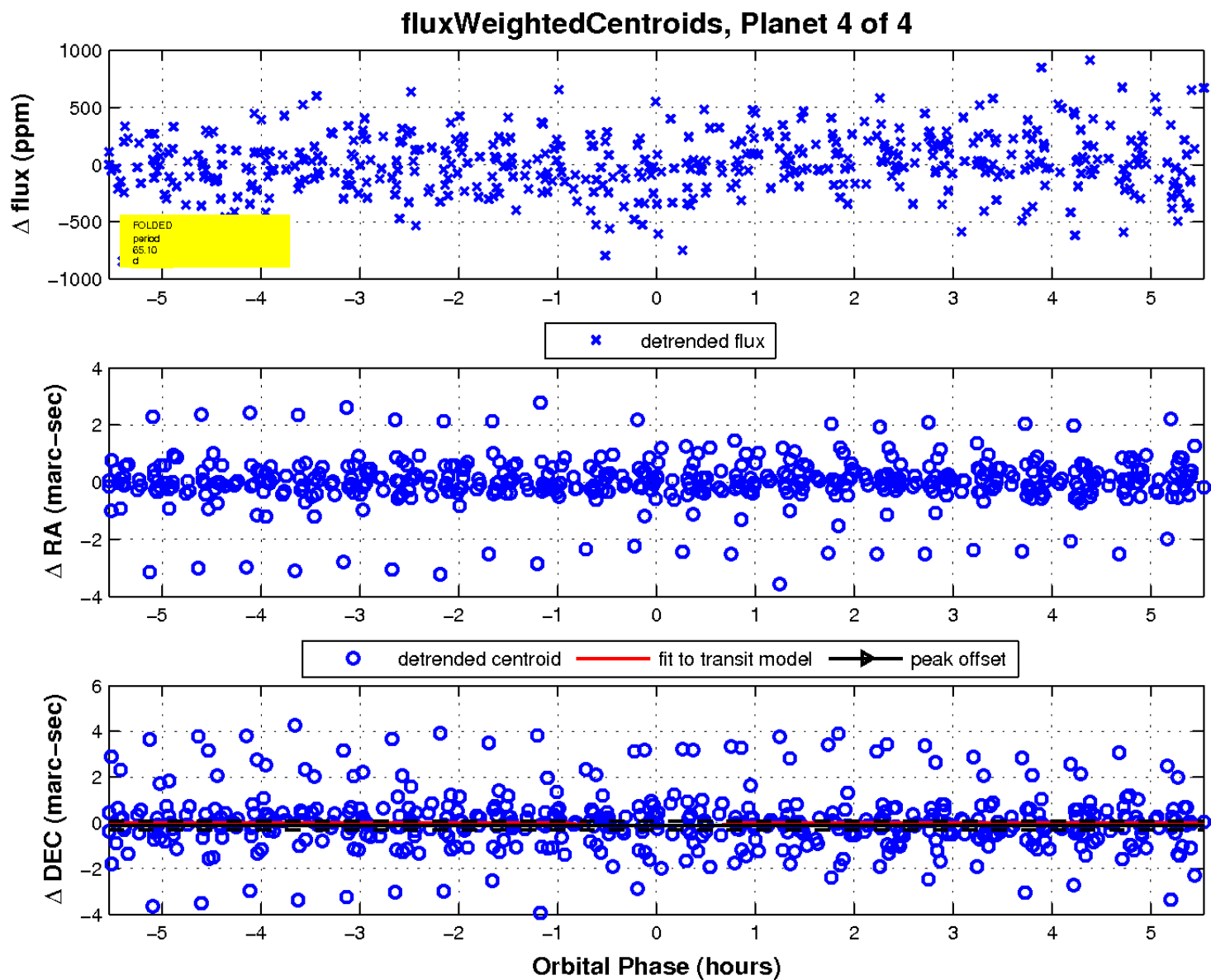
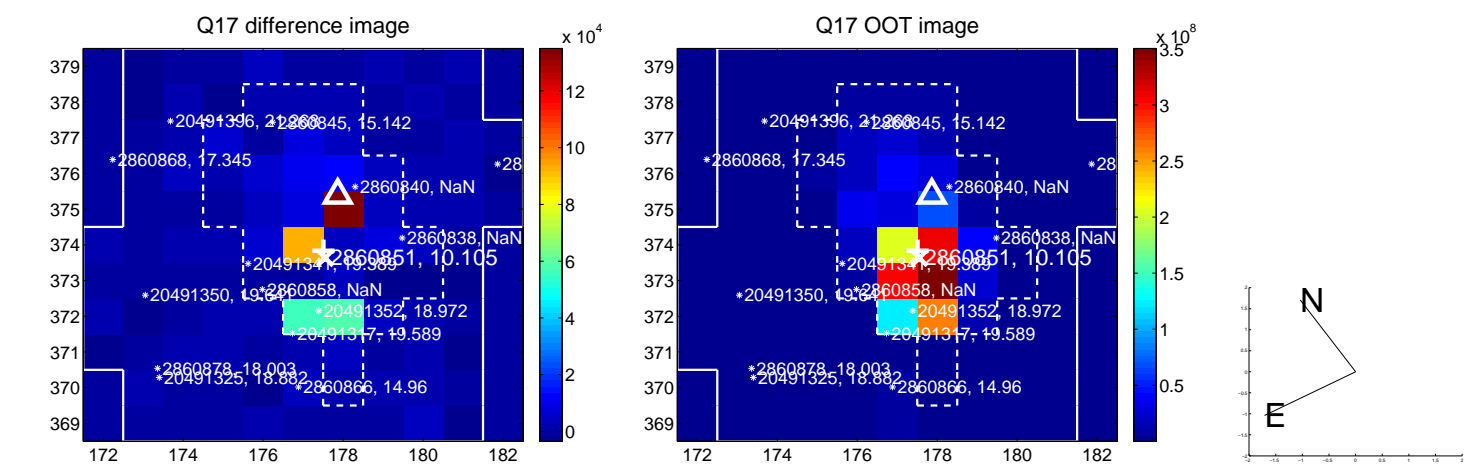
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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UKIRT Image

Declination

