

KIC 009578461

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})
009578461-01	OBS	No	0.689930	131.832244	102.5	3.071	16.8	14.2	3.30	8252	3.89	125622.52
009578461-02	OBS	No	0.517664	131.851639	288.1	6.212	14.6	31.6	3.30	8252	5.82	184250.84

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009578461-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009578461-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT

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

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

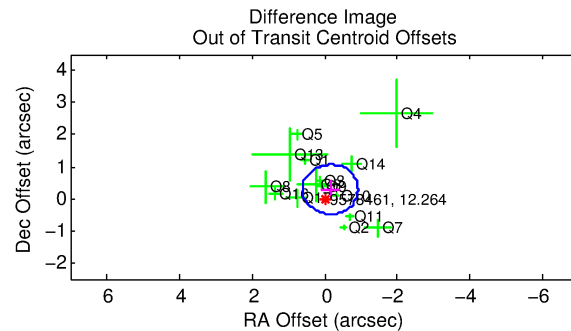
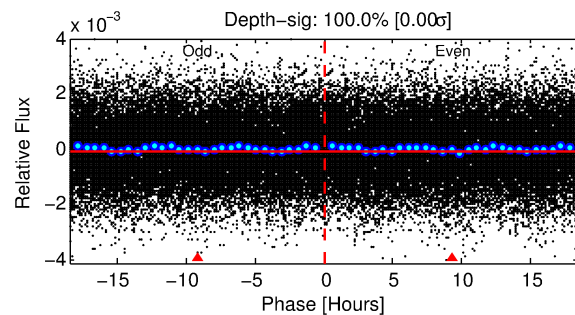
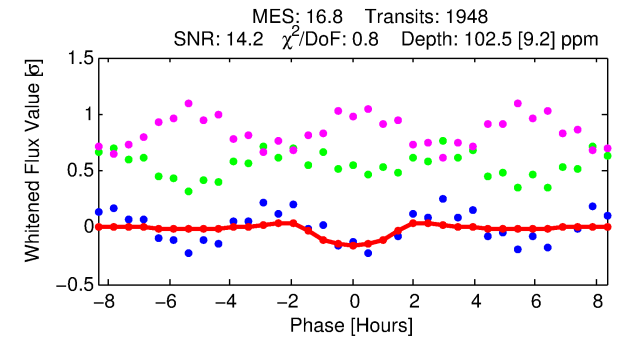
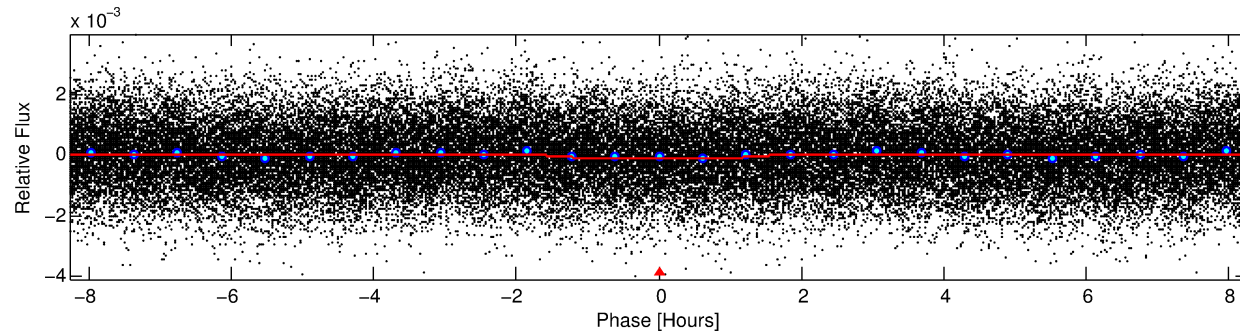
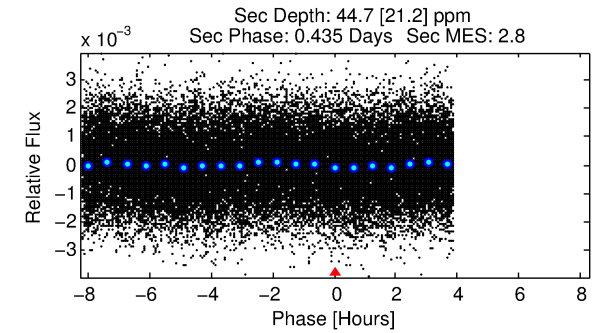
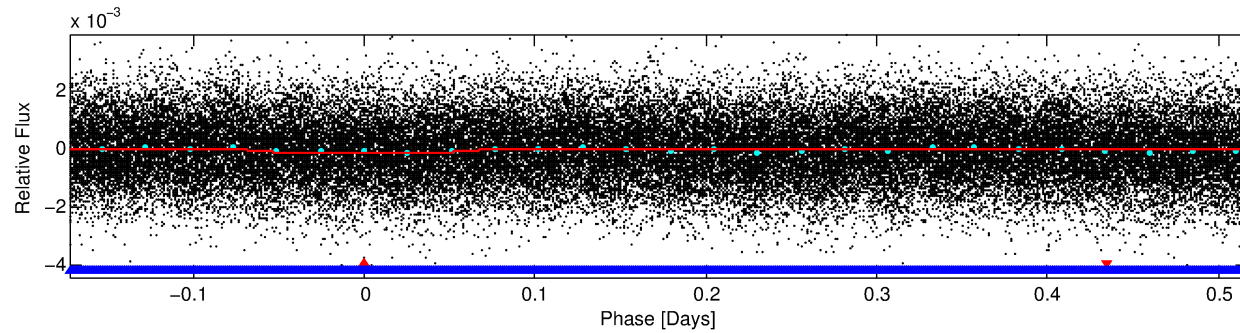
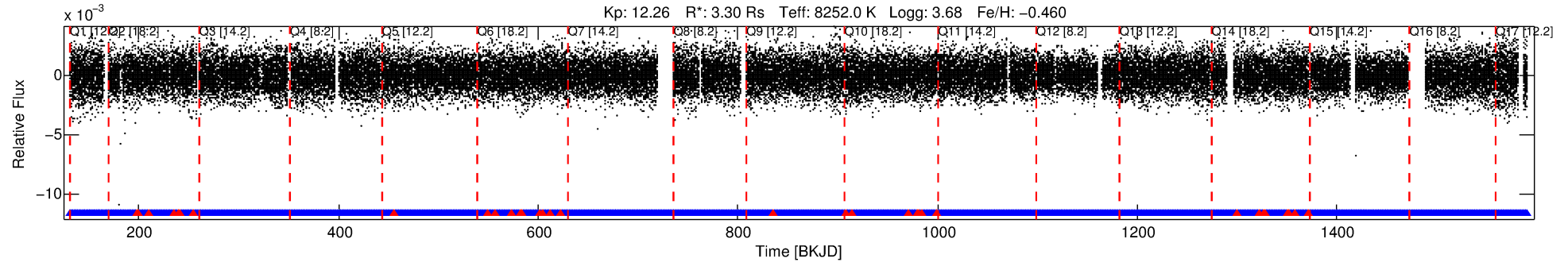
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009578461-01

No Significant Match Found

DV One-Page Summary

KIC: 9578461 Candidate: 1 of 2 Period: 0.690 d



DV Fit Results:

Period = 0.68993 [0.00001] d
Epoch = 131.8322 [0.0025] BKJD
Rp/R* = 0.0108 [0.0054]
a/R* = 1.23 [1.29]
b = 0.90 [0.67]
Seff = 125622.52 [109637.35]
Teff = 4801 [1047] K
Rp = 3.89 [2.82] Re
a = 0.0190 [0.0100] AU
Ag = 0.59 [0.82] [-0.51σ]
Teffp = 6494 [1802] K [0.81σ]

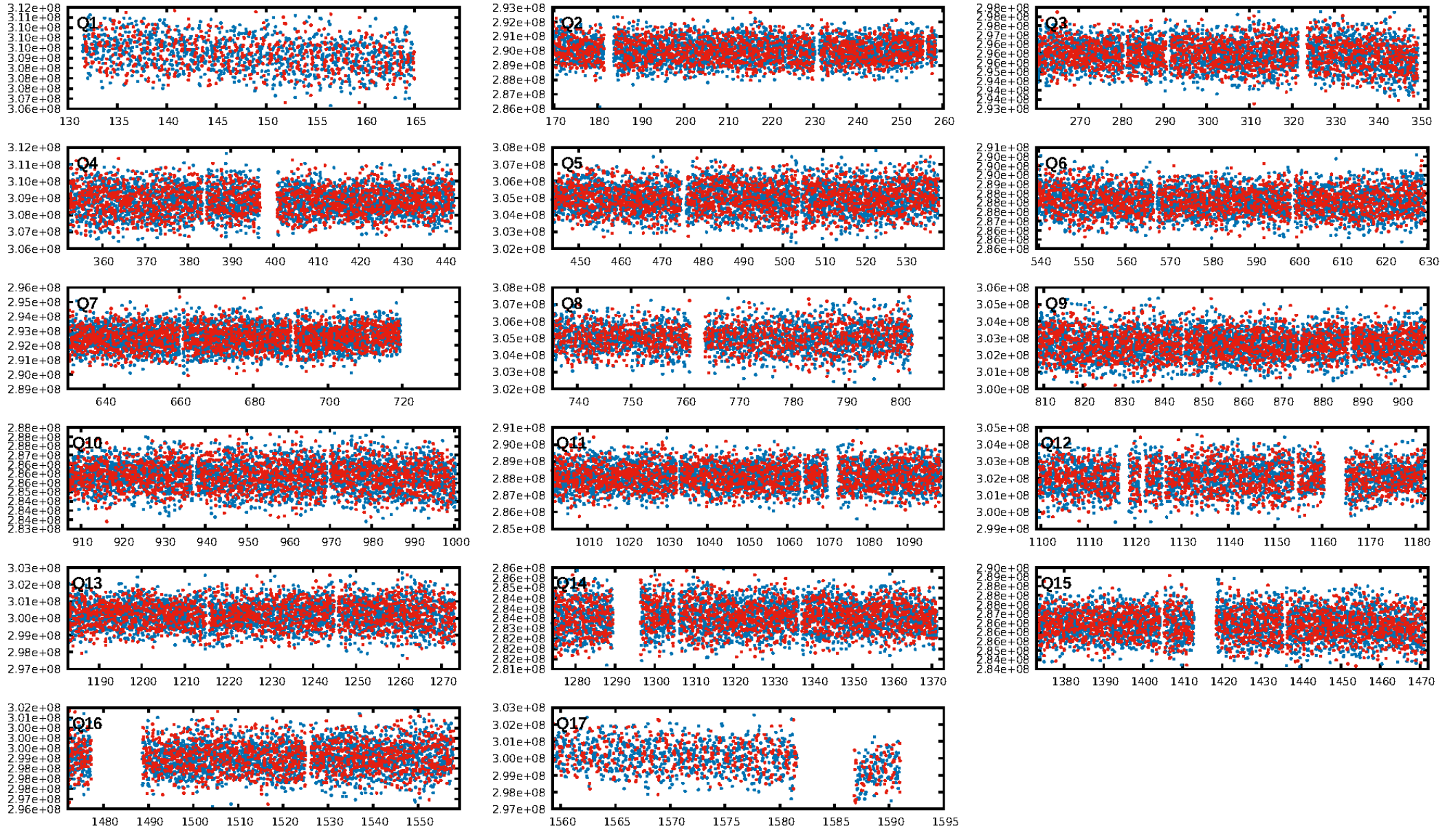
DV Diagnostic Results:

ShortPeriod-sig: 44.9% [0.60σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 0.98 [1823/1859]
GhostDiagnostic-chr: 5.097
Centroid-sig: 3.0%
Centroid-so: 0.290 arcsec [2.81σ]
OotOffset-rm: 0.333 arcsec [1.29σ]
KicOffset-rm: 0.465 arcsec [1.84σ]
OotOffset-st: 4/3/3/5 [15]
KicOffset-st: 4/3/3/5 [15]
DiffImageQuality-fgm: 0.67 [10/15]
DiffImageOverlap-fno: 0.00 [0/17]

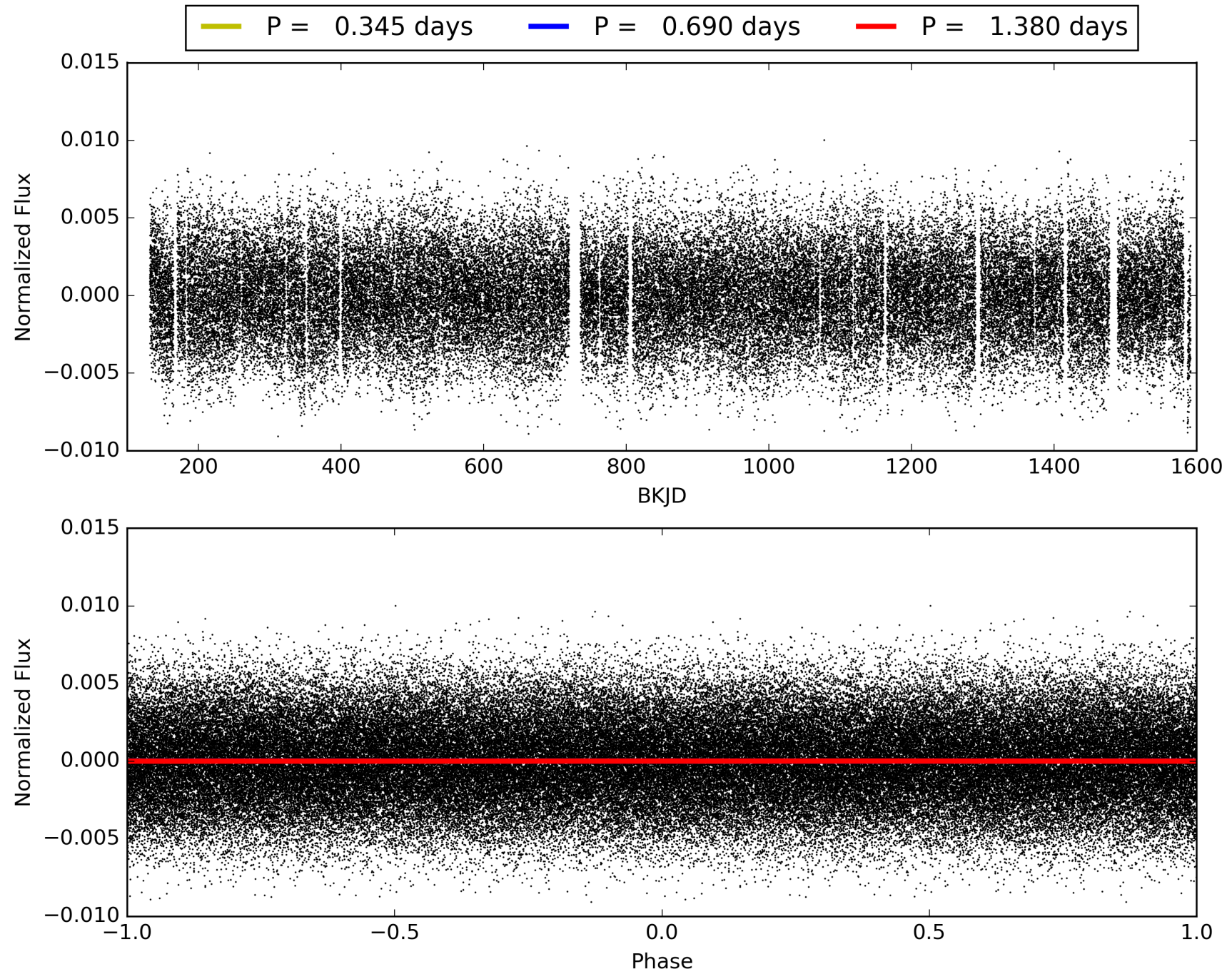
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 009578461-01, PDC Light Curves

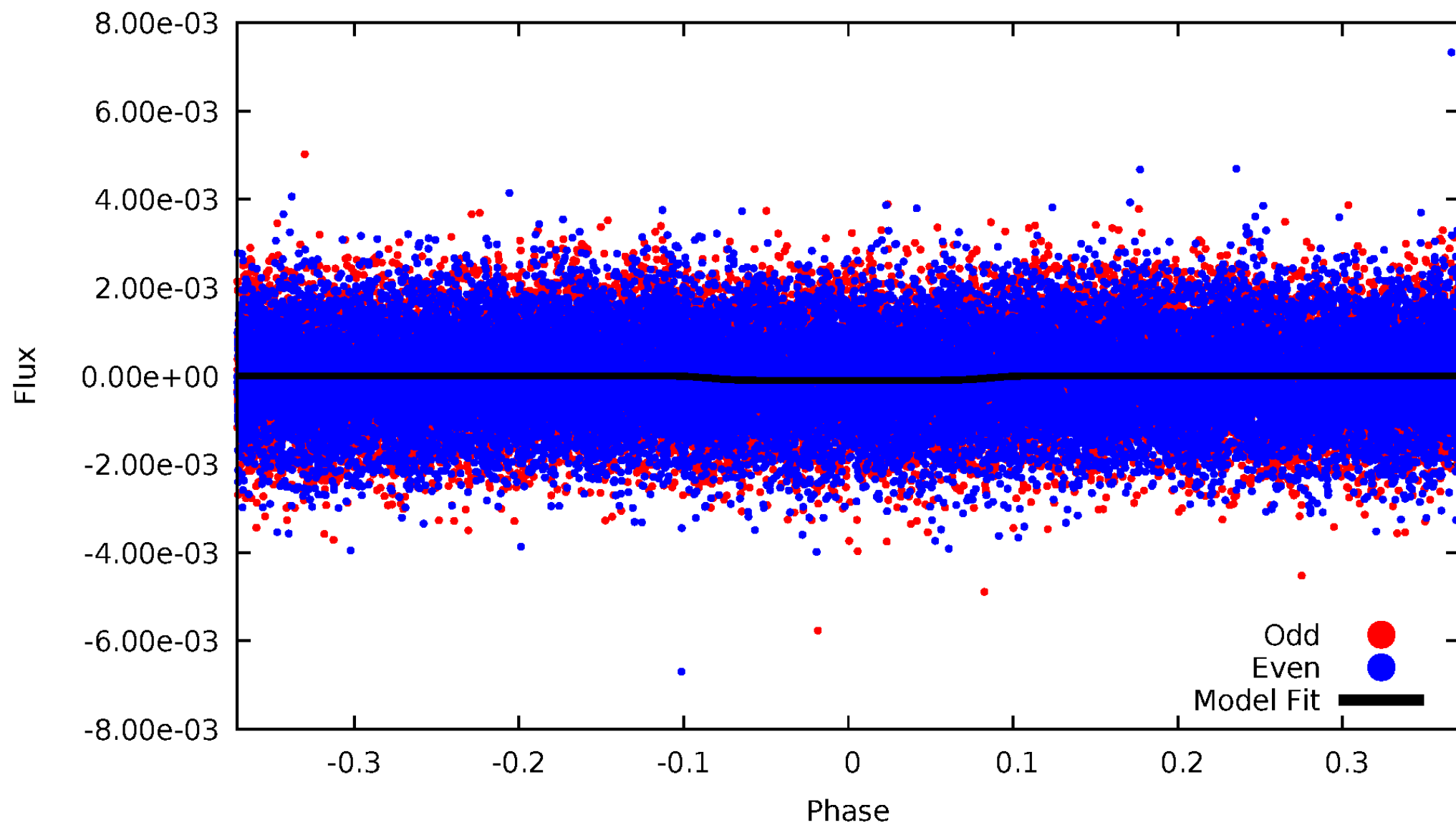


TCE 009578461-01



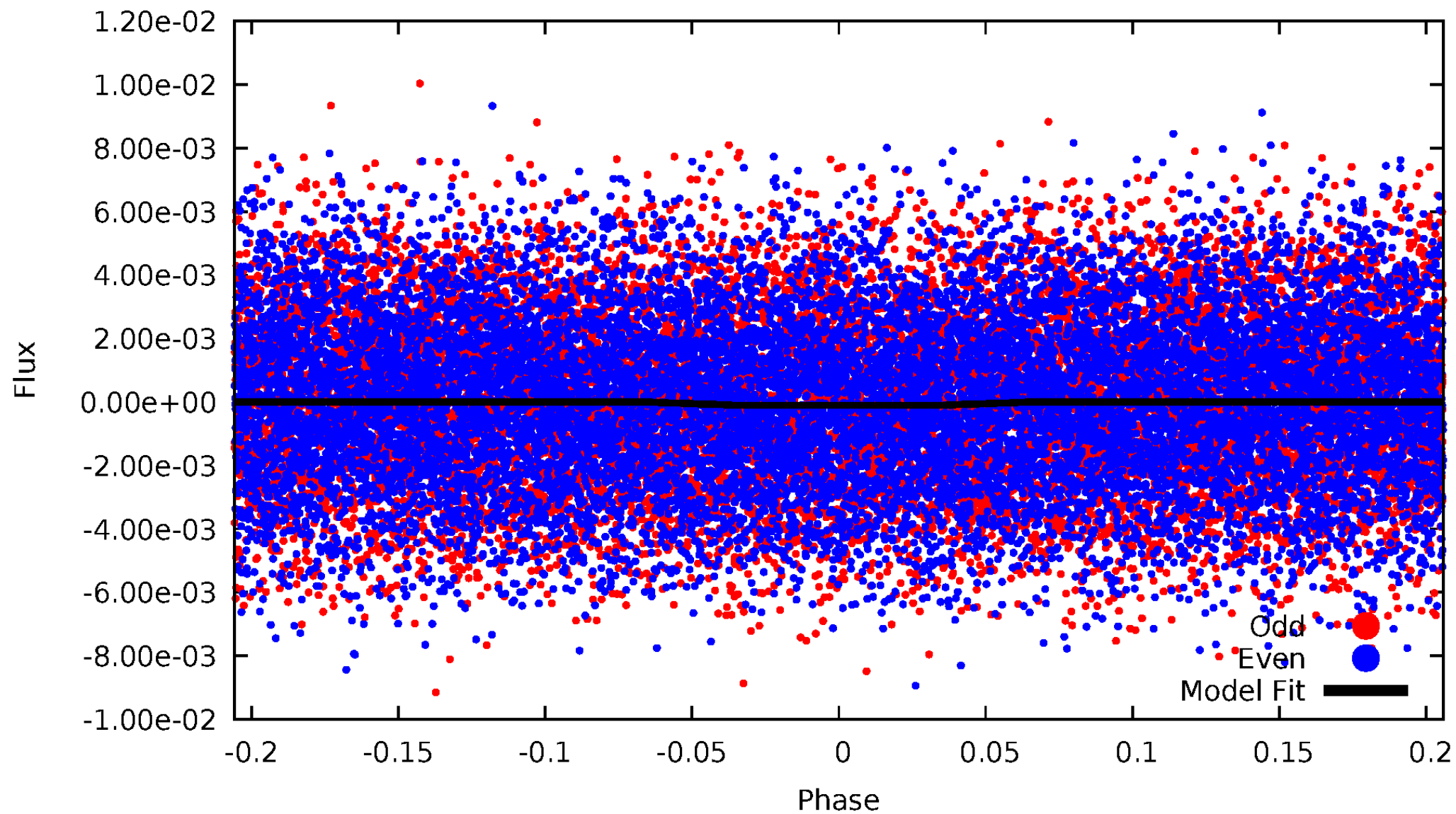
DV Odd/Even

TCE 009578461-01



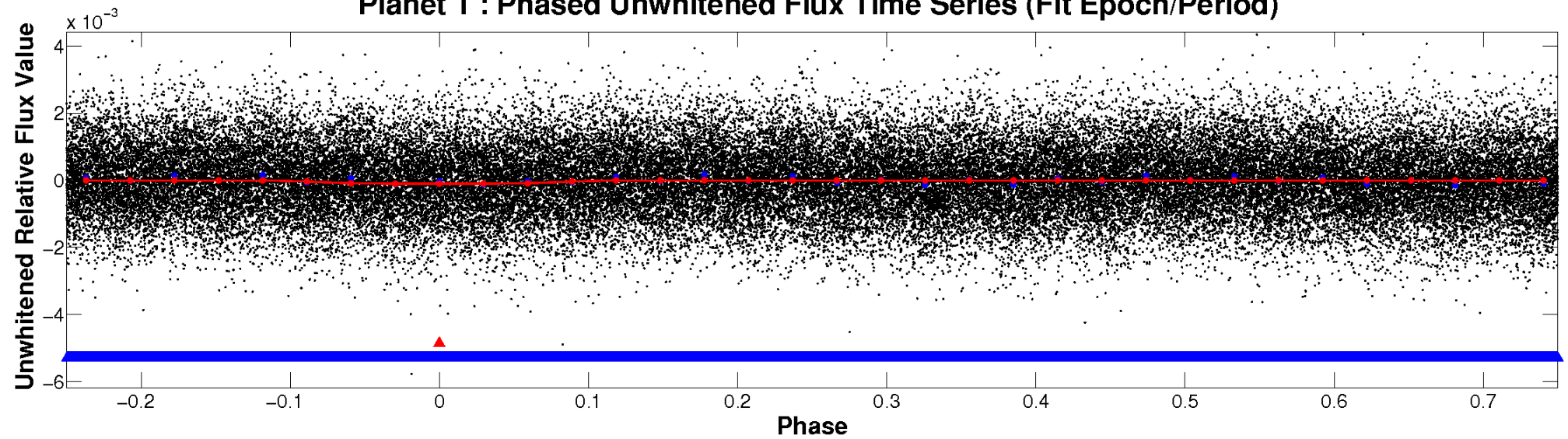
ALT Odd/Even

TCE 009578461-01

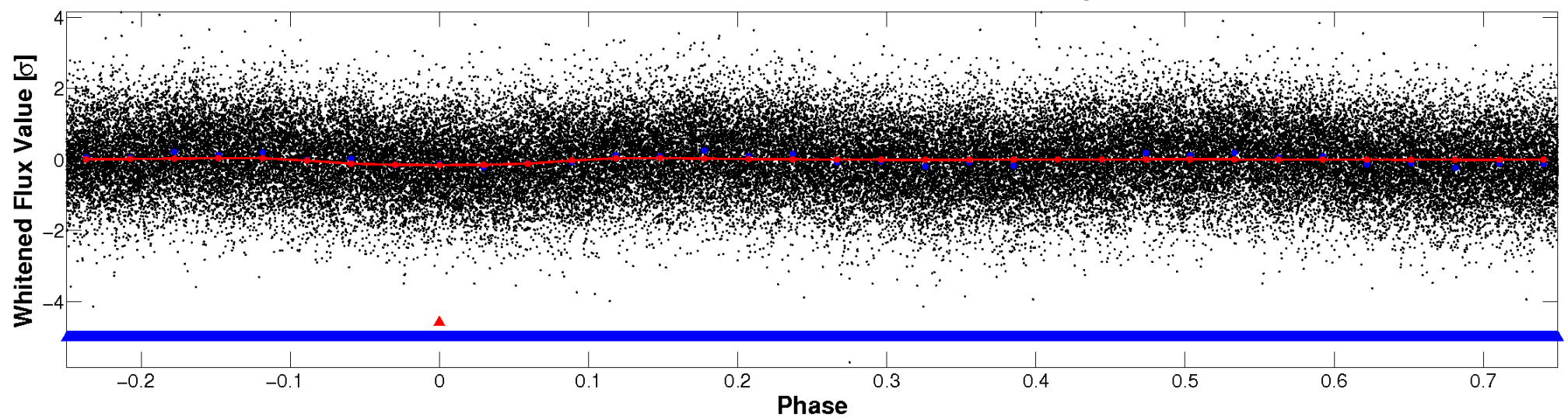


Non-Whitened Vs. Whitened Light Curve

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

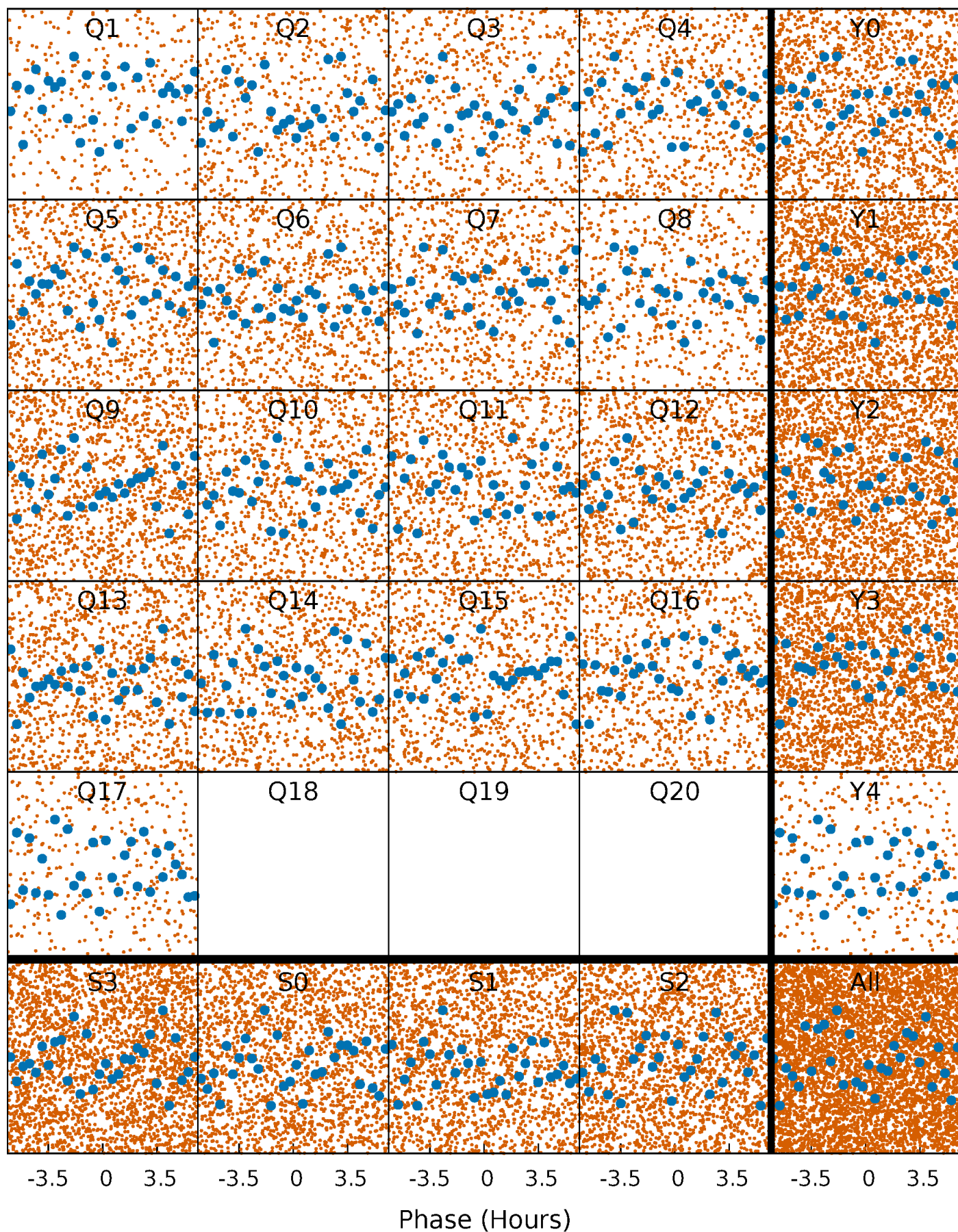


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



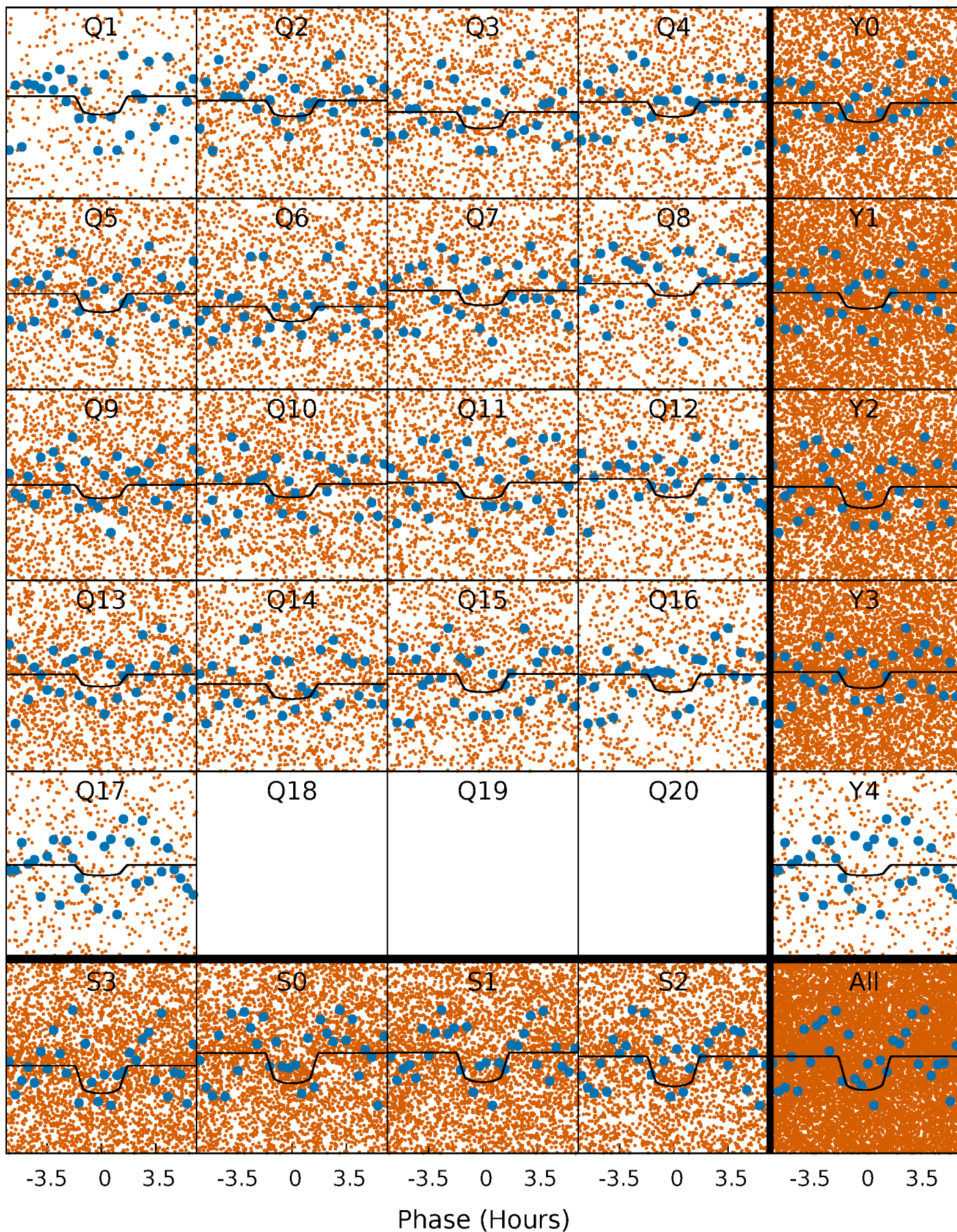
PDC Quarter-Phased Transit Curves

TCE 009578461-01 P= 0.689930 Days $T_0=131.832244$ (BKJD)



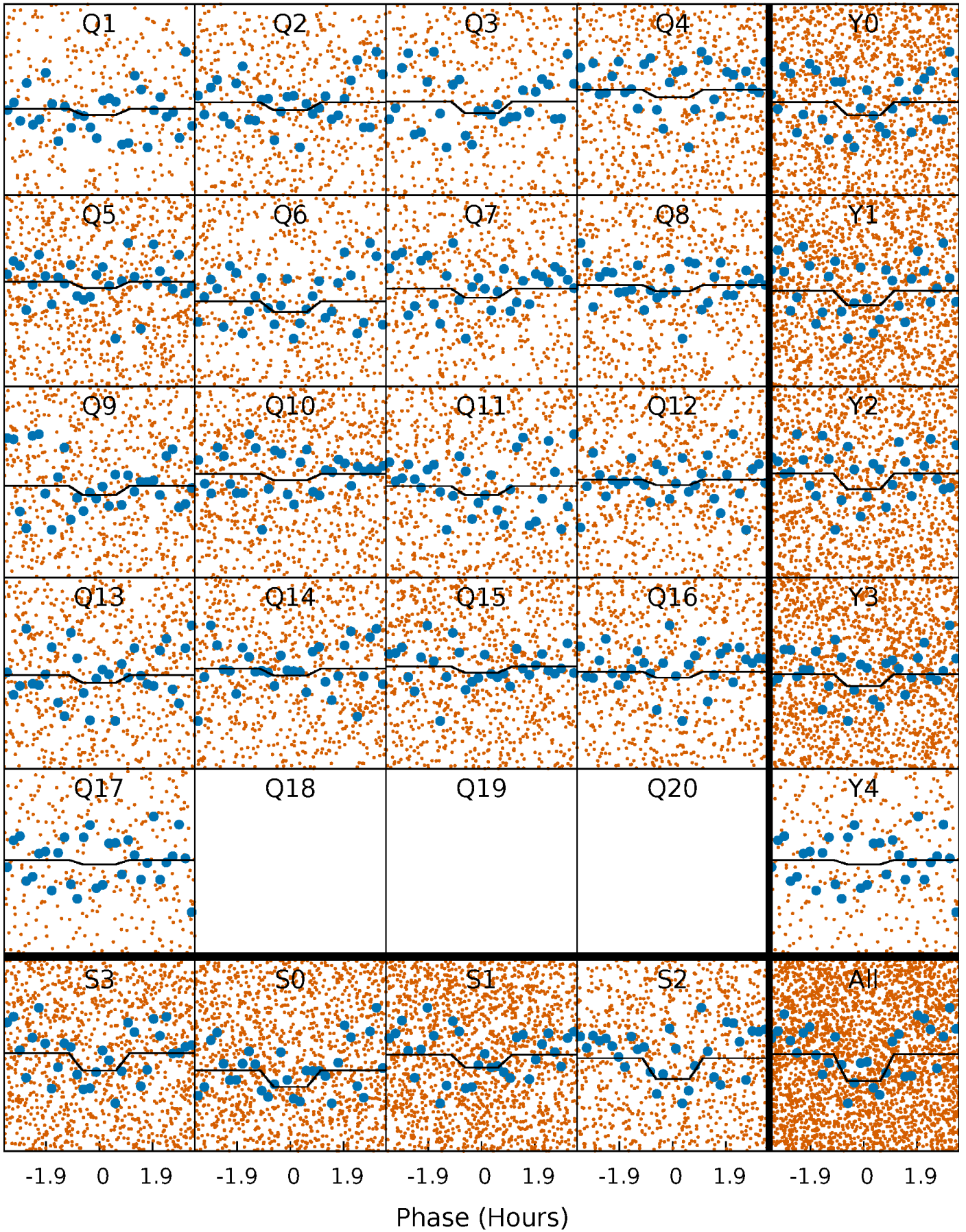
DV Quarter-Phased Transit Curves

TCE 009578461-01 P= 0.689930 Days $T_0=131.832244$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

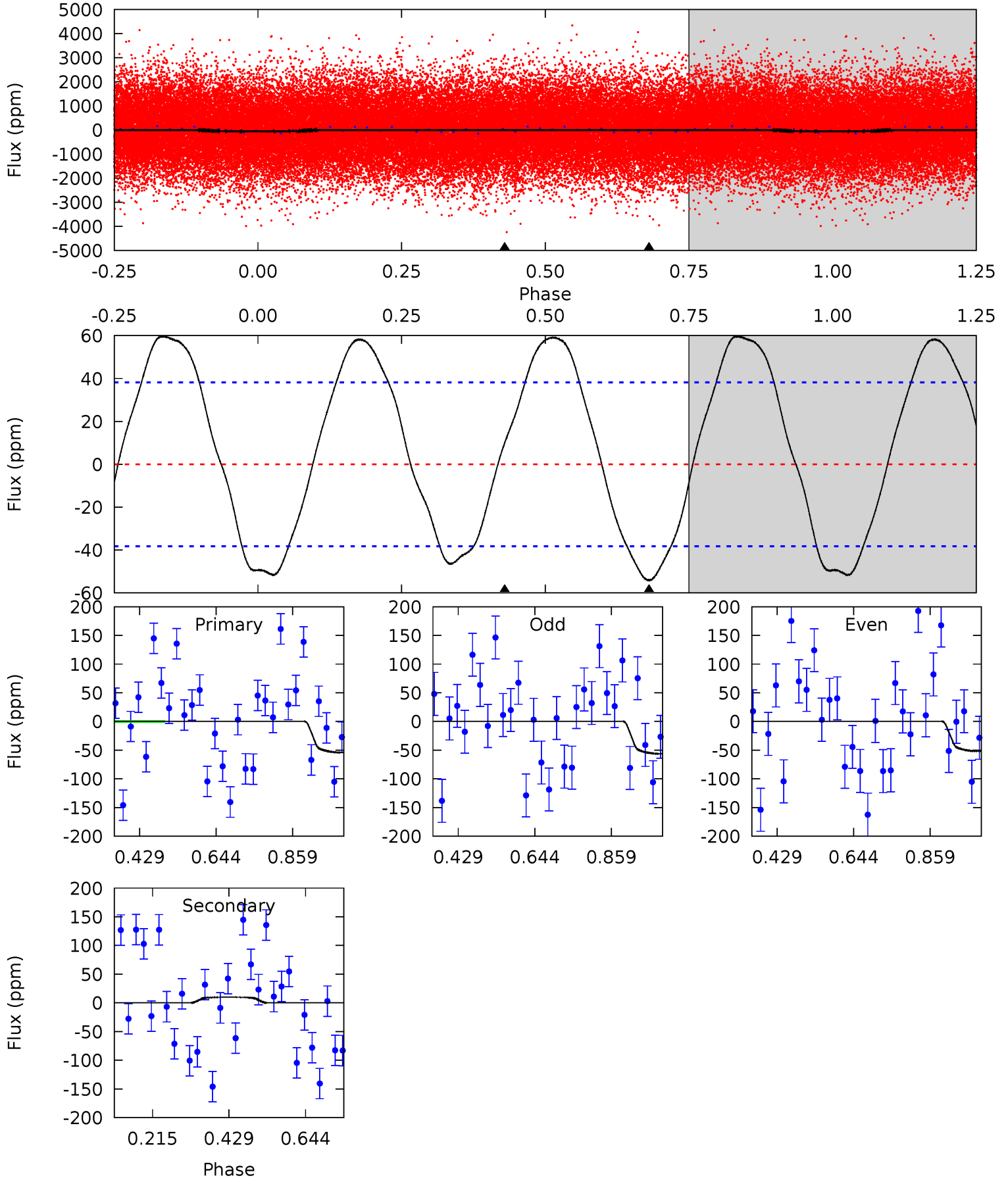
TCE 009578461-01 P= 0.689946 Days $T_0=131.831512$ (BKJD)



DV Model-Shift Uniqueness Test

009578461-01, P = 0.689930 Days, E = 131.142314 Days

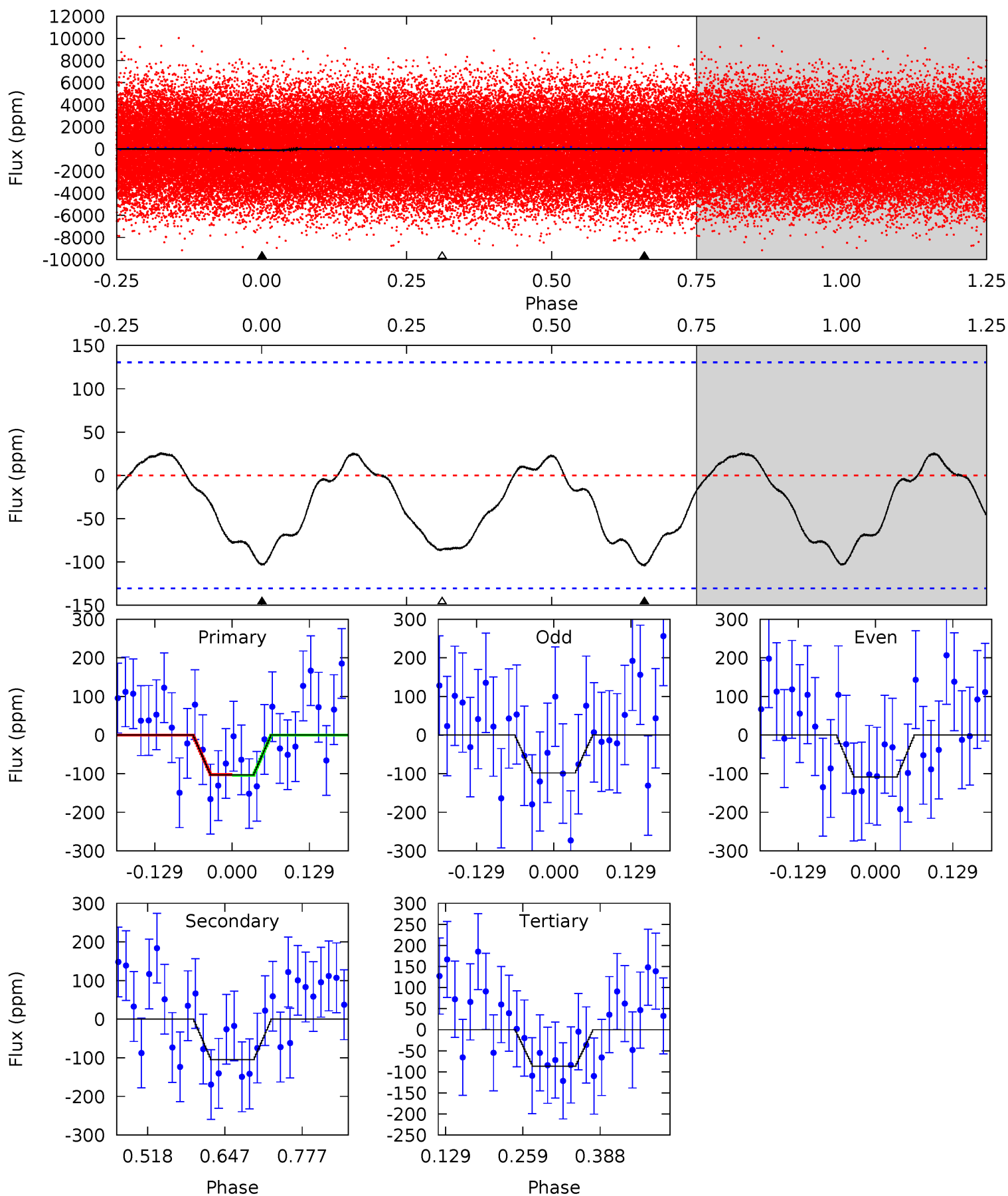
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.25	-1.15	0	0	4.40	1.24	4.49	6.25	6.25	-1.15	-1.15	0.26	1.16	0.52	1.02



Alt Model-Shift Uniqueness Test

009578461-01, P = 0.689946 Days, E = 131.141566 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.57	3.61	2.99	0	4.51	1.52	1.33	0.58	3.57	0.63	3.61	0.19	1.10	0.20	0.03



Stellar Parameters For KIC 009578461

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	8252^{+236}_{-324}	$3.683^{+0.510}_{-0.090}$	$-0.460^{+0.200}_{-0.300}$	$3.300^{+0.545}_{-1.744}$	$1.913^{+0.079}_{-0.471}$	$0.075^{+0.433}_{-0.021}$
	+3%/-4%	+14%/-2%	+43%/-65%	+17%/-53%	+4%/-25%	+577%/-29%
Source	KIC0	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 009578461-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	10 ± 9	$3.45^{+2.03}_{-1.72}$	6450^{+474}_{-869}	-5645^{+651}_{-1029}	$-0.141^{+0.129}_{-0.539}$
Alt.	-105 ± 29	$3.22^{+1.88}_{-1.70}$	6467^{+491}_{-885}	7699^{+5746}_{-2084}	$1.906^{+6.538}_{-1.191}$

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

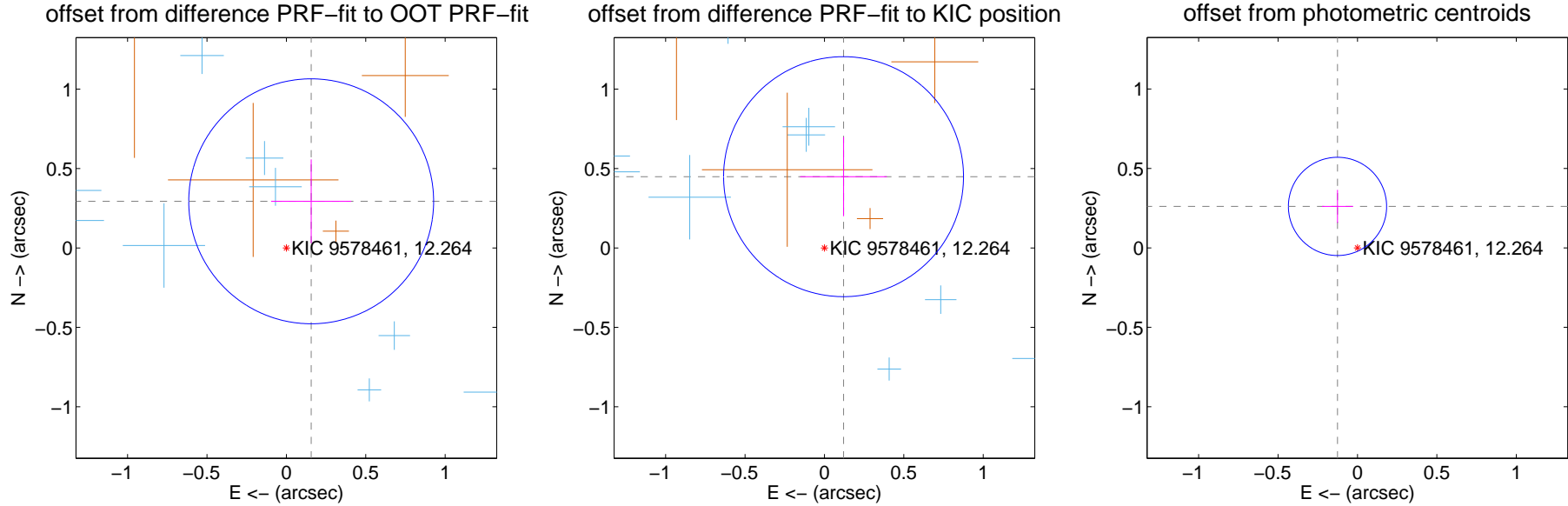
DV Centroid Data

Supplemental centroid analysis for 009578461-01. Kepler magnitude: 12.26. Transit SNR 14.17

There are 10 quarters with good PRF difference image offsets

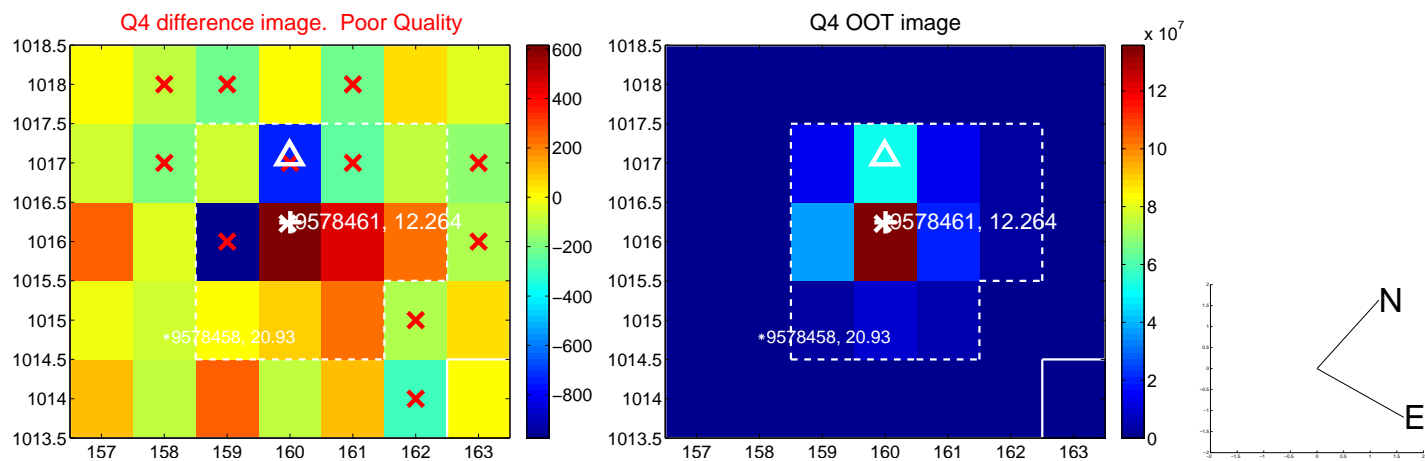
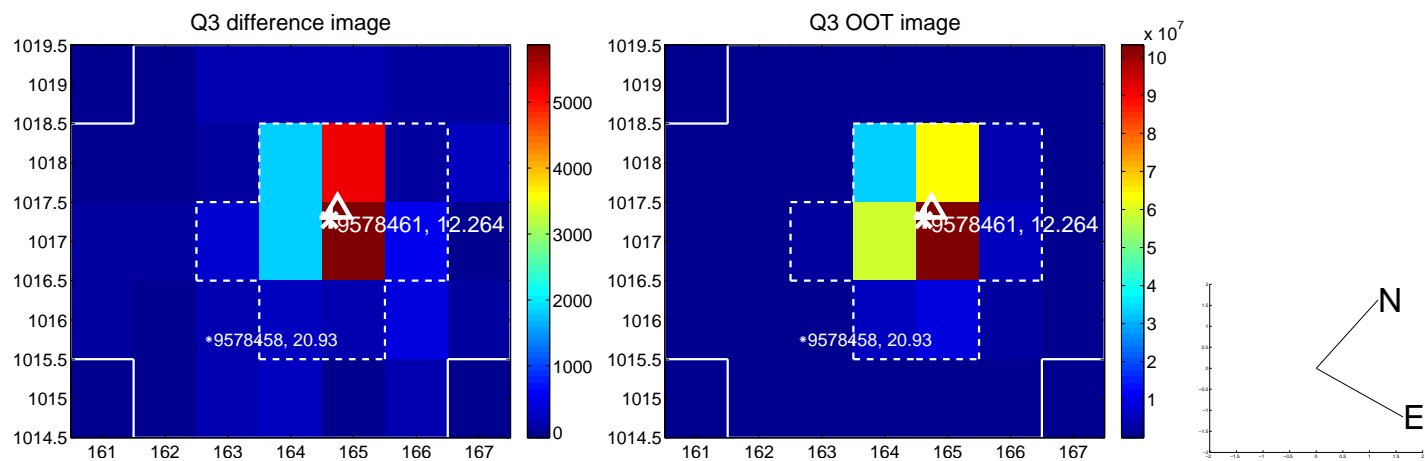
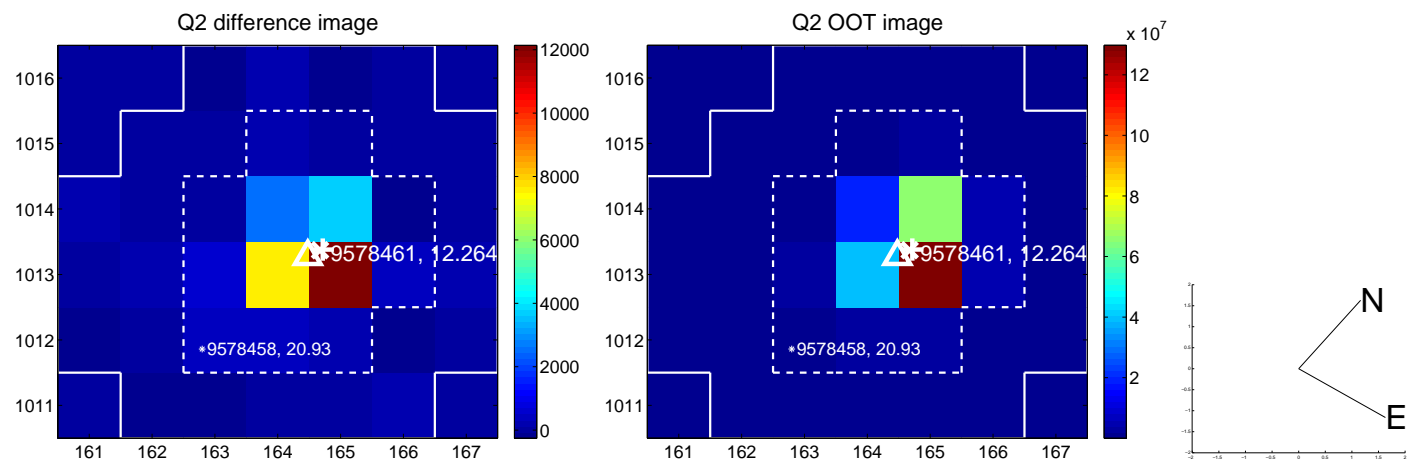
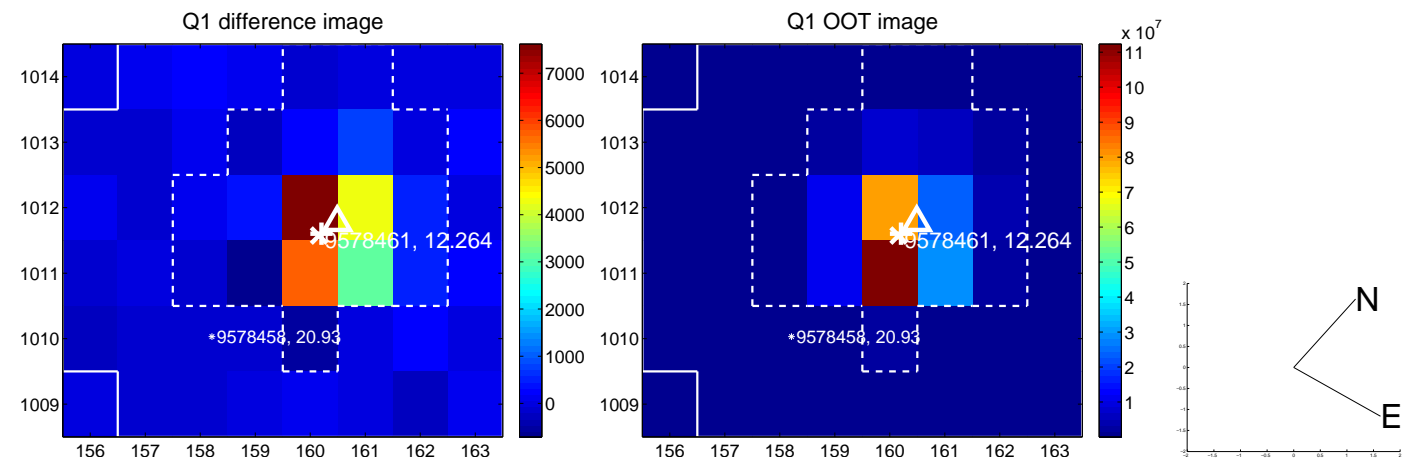
The direct PRF centroid is offset from the target star catalog position by about 0.31 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.333 ± 0.257	1.29	-0.156 ± 0.252	0.294 ± 0.264
PRF-fit source offset from KIC position	0.465 ± 0.252	1.84	-0.120 ± 0.273	0.449 ± 0.249
photometric centroid source offset	0.29 ± 0.10	2.81	0.13 ± 0.10	0.26 ± 0.10

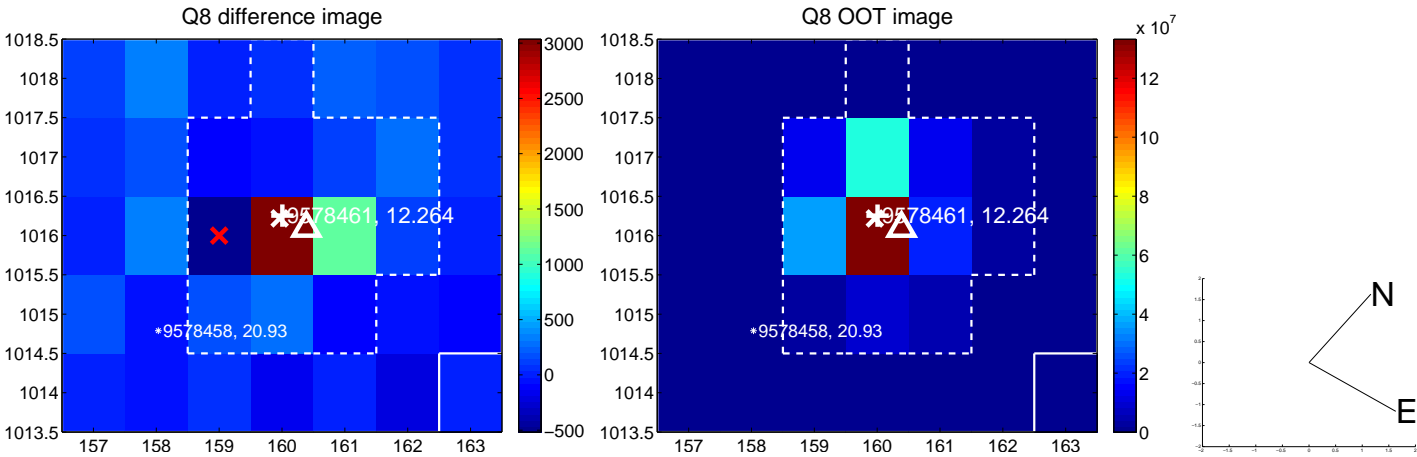
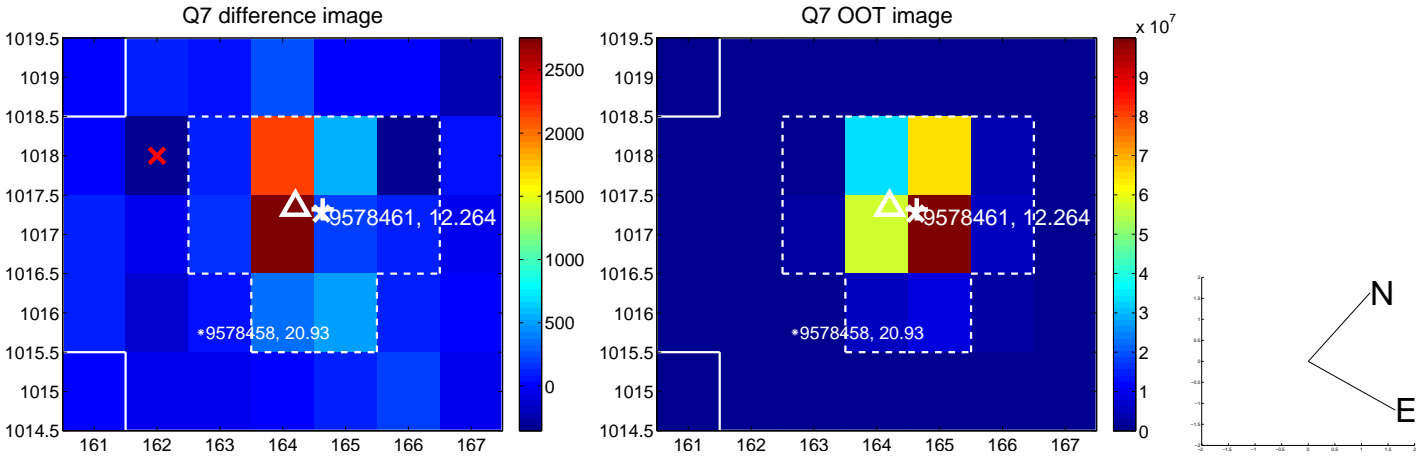
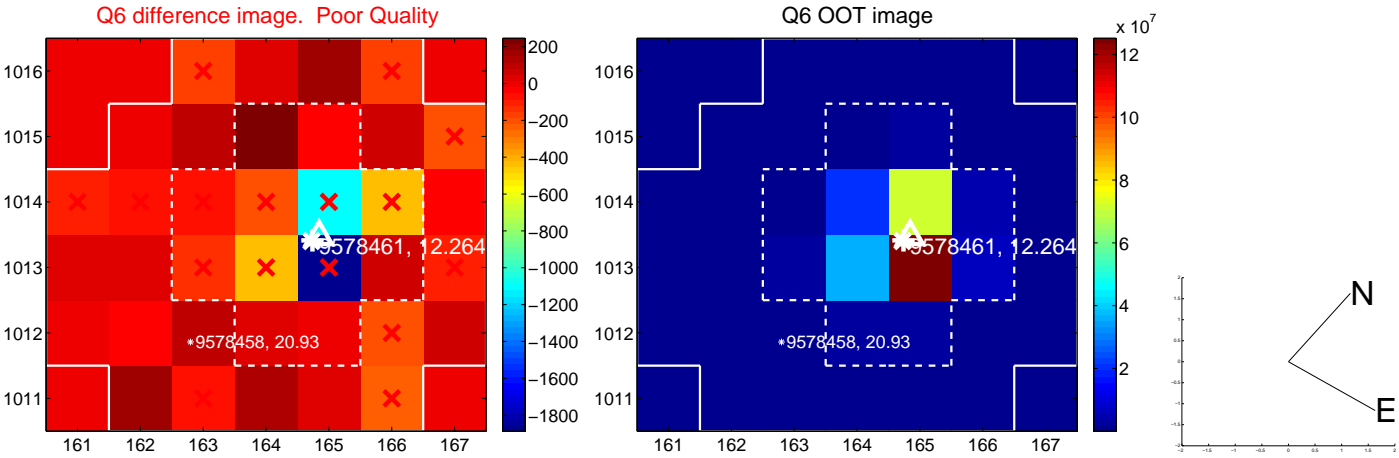
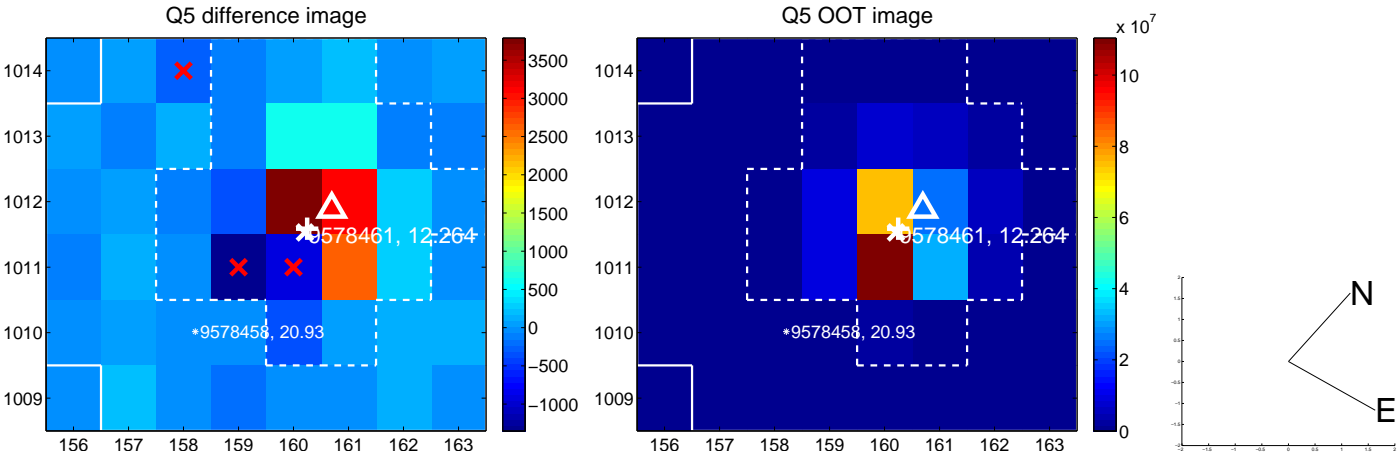


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

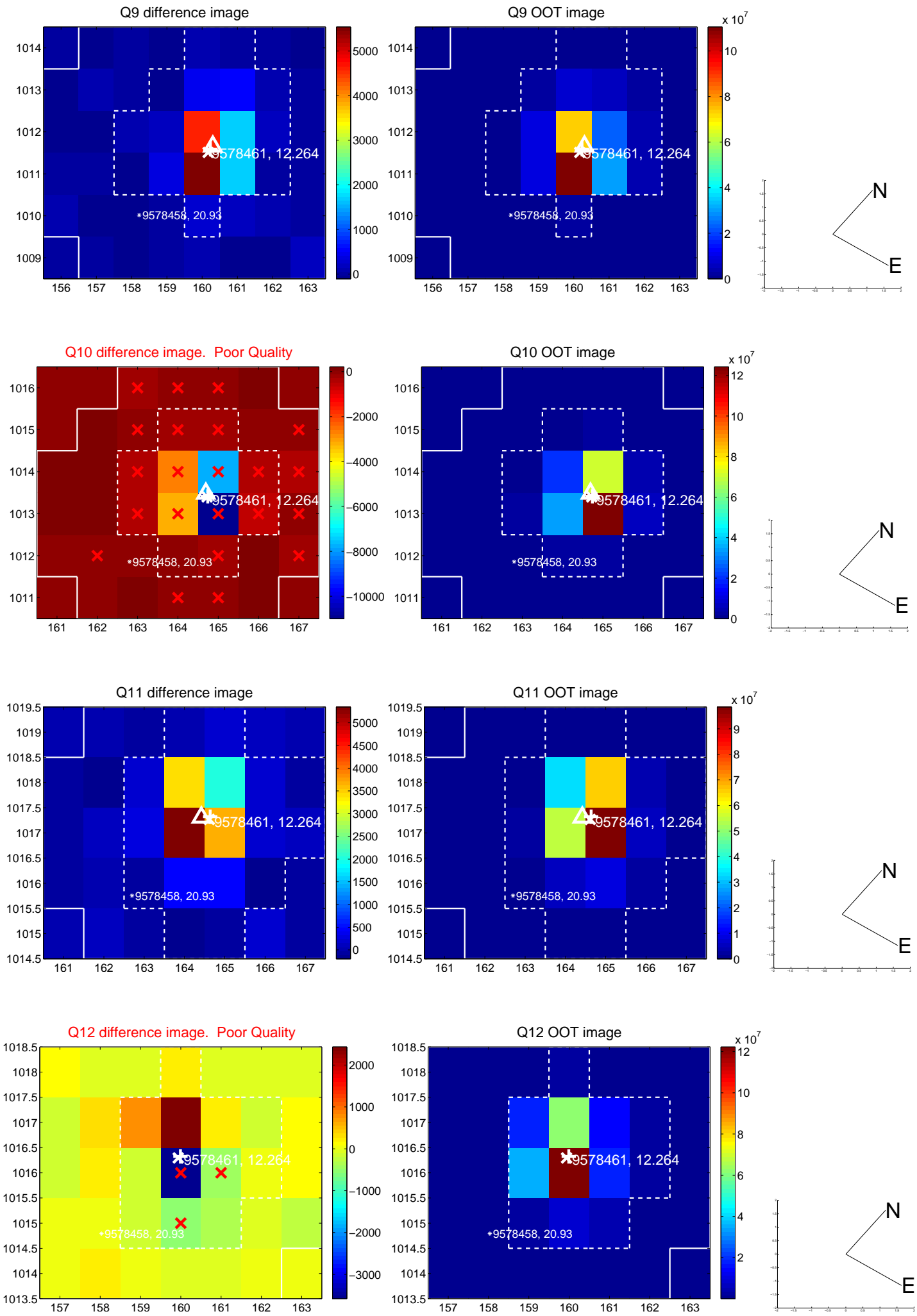
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



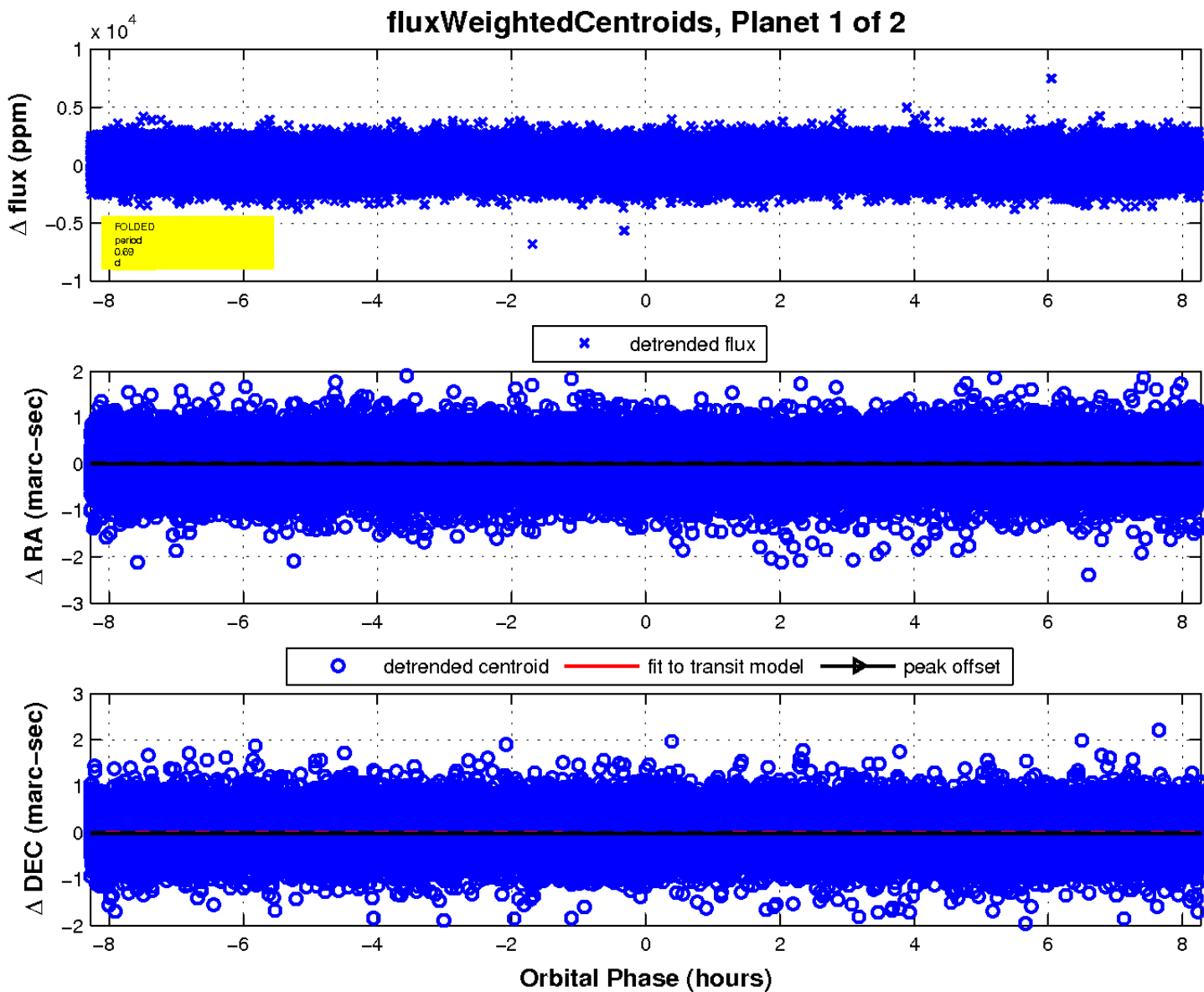
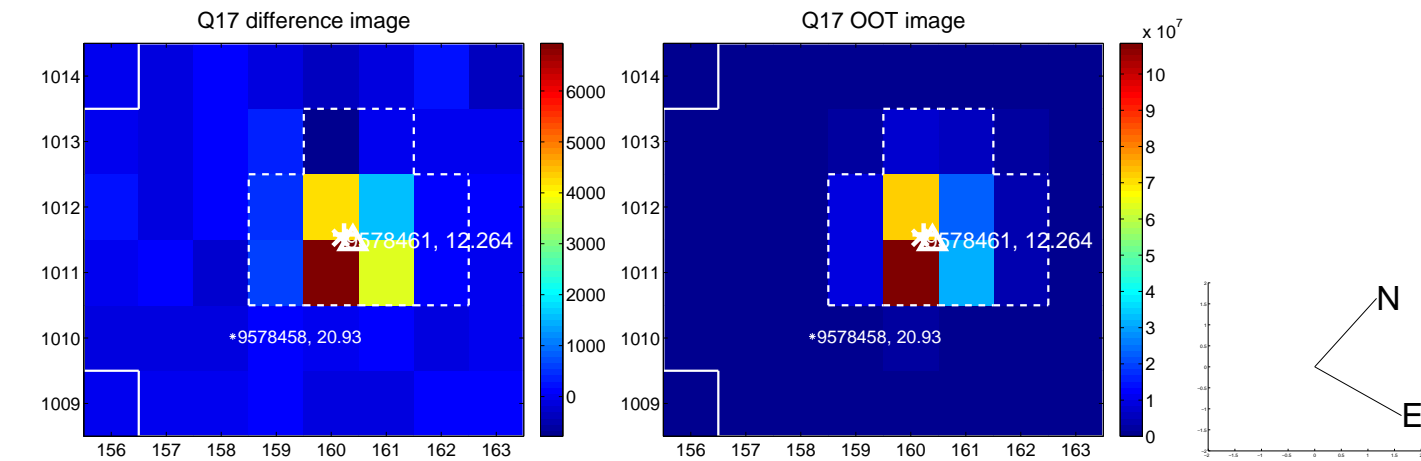
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

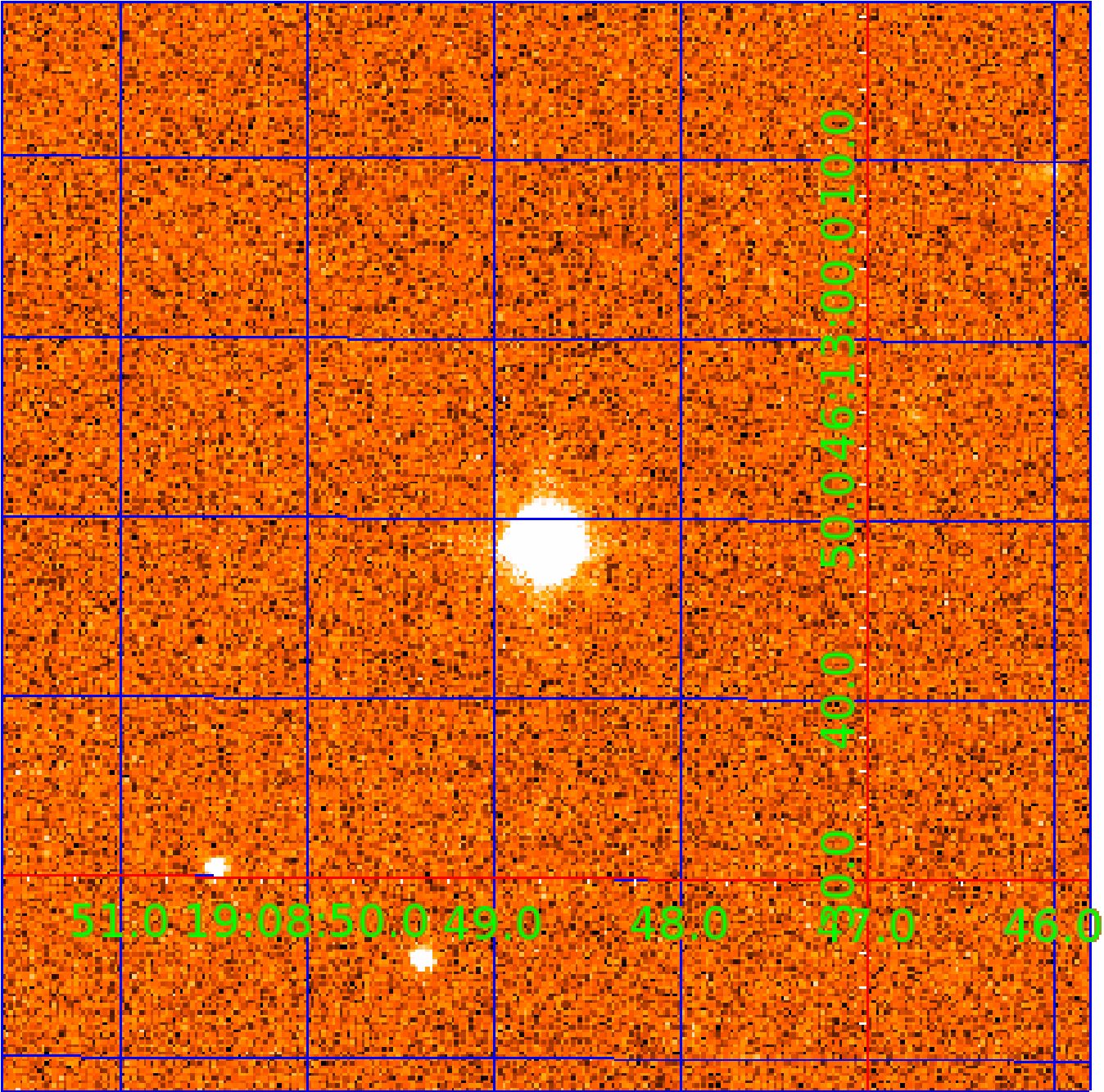


white \times : KIC target position; $+$: OOT centroid; Δ : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009578461

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})
009578461-01	OBS	No	0.689930	131.832244	102.5	3.071	16.8	14.2	3.30	8252	3.89	125622.52
009578461-02	OBS	No	0.517664	131.851639	288.1	6.212	14.6	31.6	3.30	8252	5.82	184250.84

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009578461-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009578461-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT

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

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

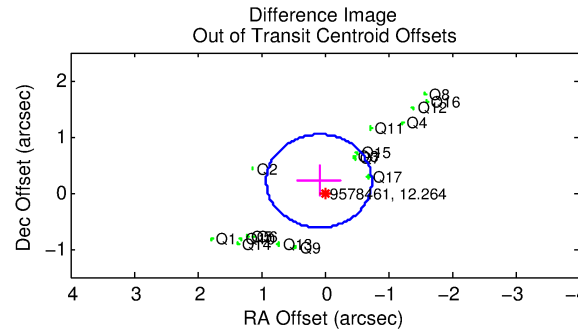
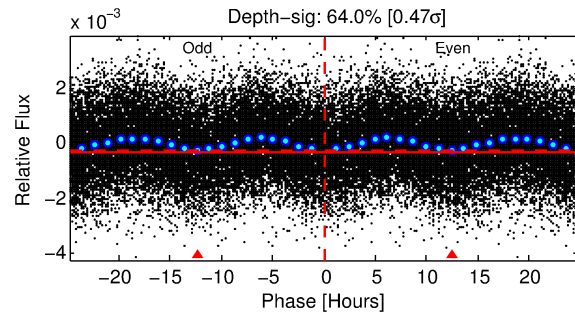
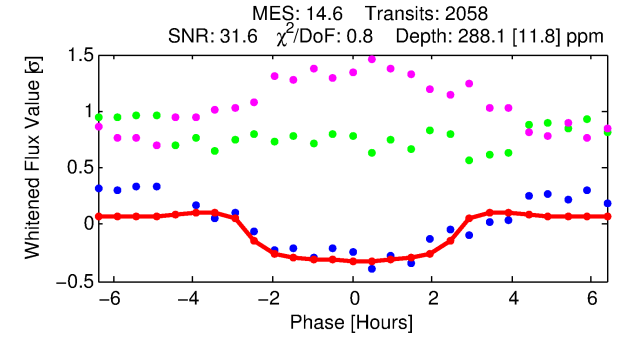
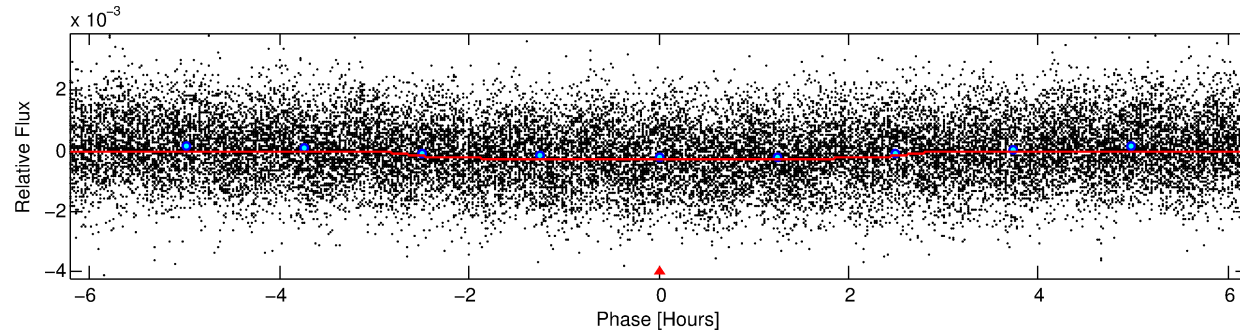
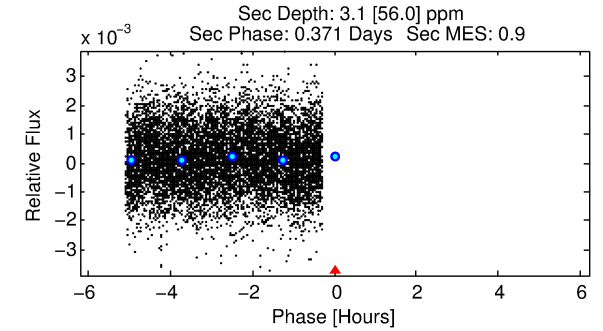
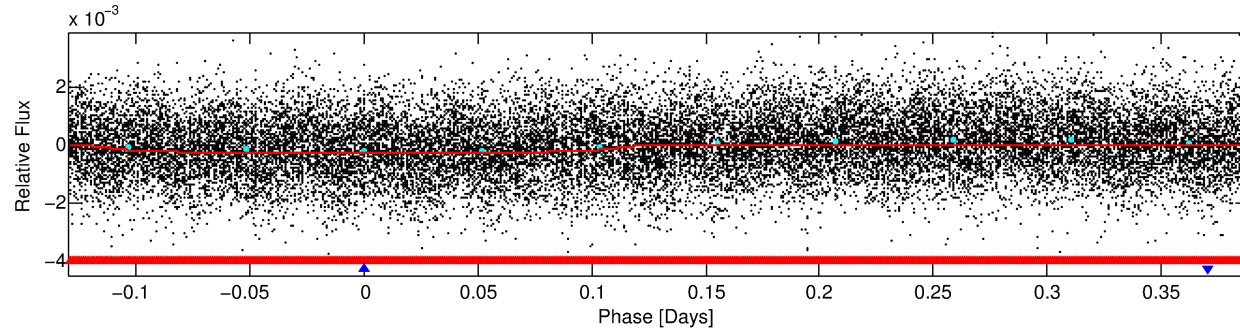
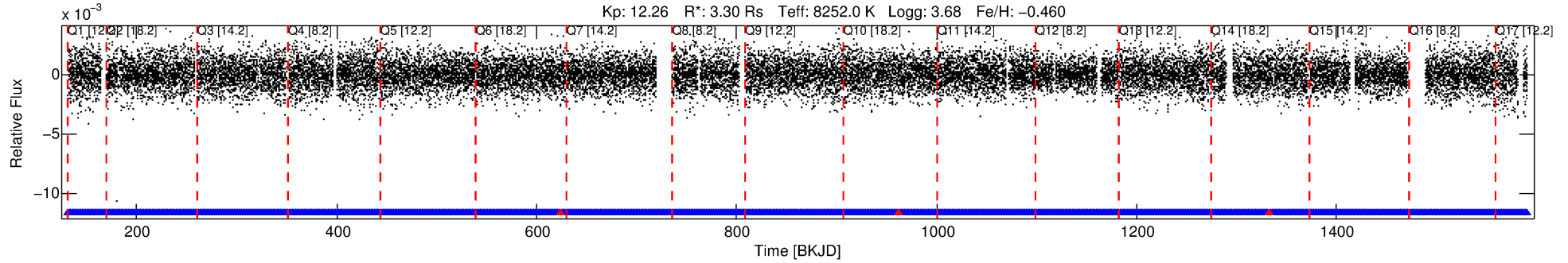
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009578461-02

No Significant Match Found

DV One-Page Summary

KIC: 9578461 Candidate: 2 of 2 Period: 0.518 d



DV Fit Results:

Period = 0.51766 [0.00000] d
Epoch = 131.8516 [0.0018] BKJD
Rp/R* = 0.0161 [0.0016]
a/R* = 1.02 [0.01]
b = 0.51 [0.79]
Seff = 184250.84 [160805.36]
Teff = 5283 [1153] K
Rp = 5.81 [3.13] Re
a = 0.0157 [0.0083] AU
Ag = 0.01 [0.22] [-4.41σ]
Teffp = 2715 [12438] K [-0.21σ]

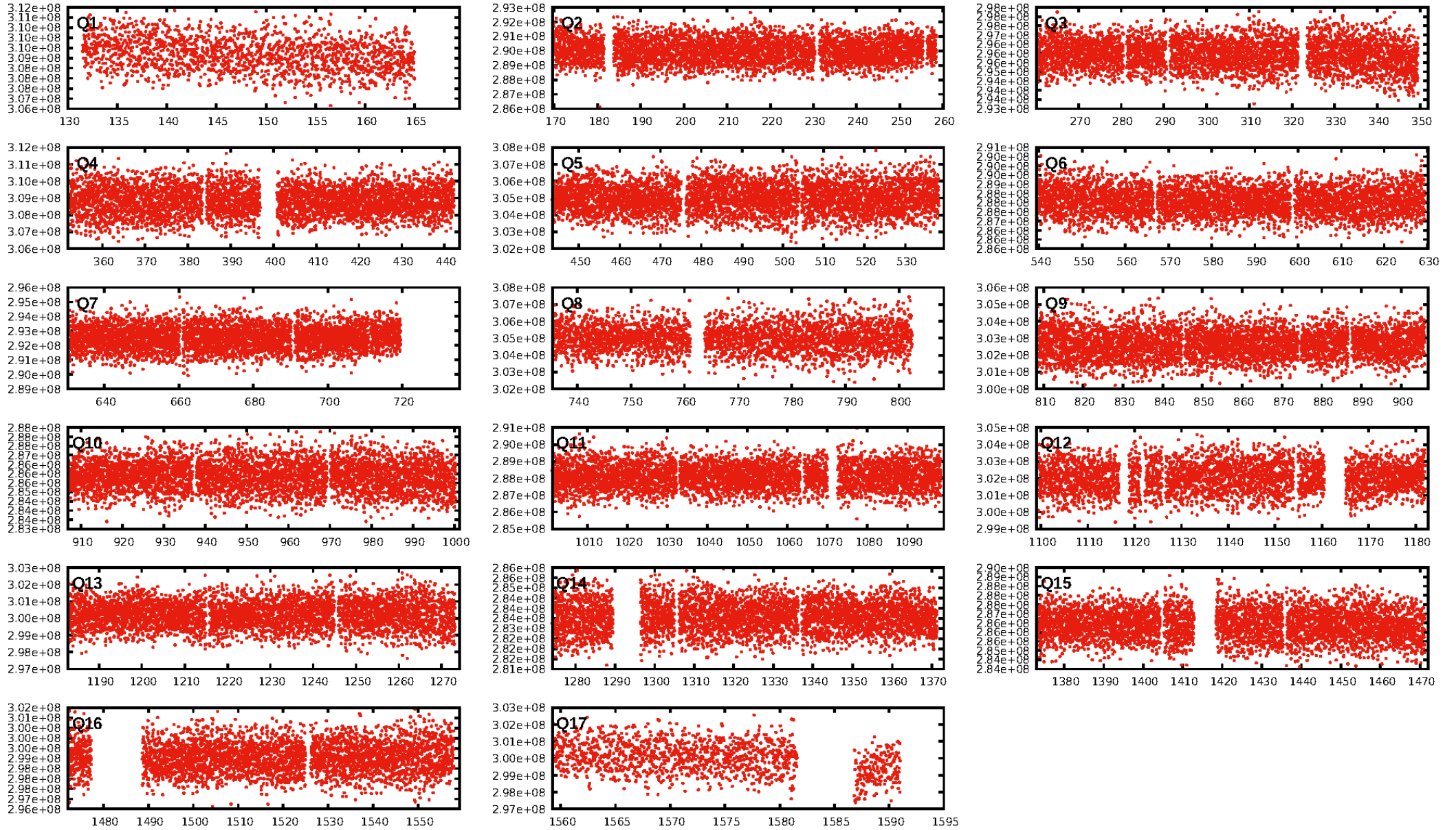
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 44.9% [0.60σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [1965/1968]
GhostDiagnostic-chr: 2.095
Centroid-sig: 5.1%
Centroid-so: 0.196 arcsec [8.01σ]
OotOffset-rm: 0.227 arcsec [0.82σ]
KicOffset-rm: 0.410 arcsec [1.48σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 0.00 [0/17]

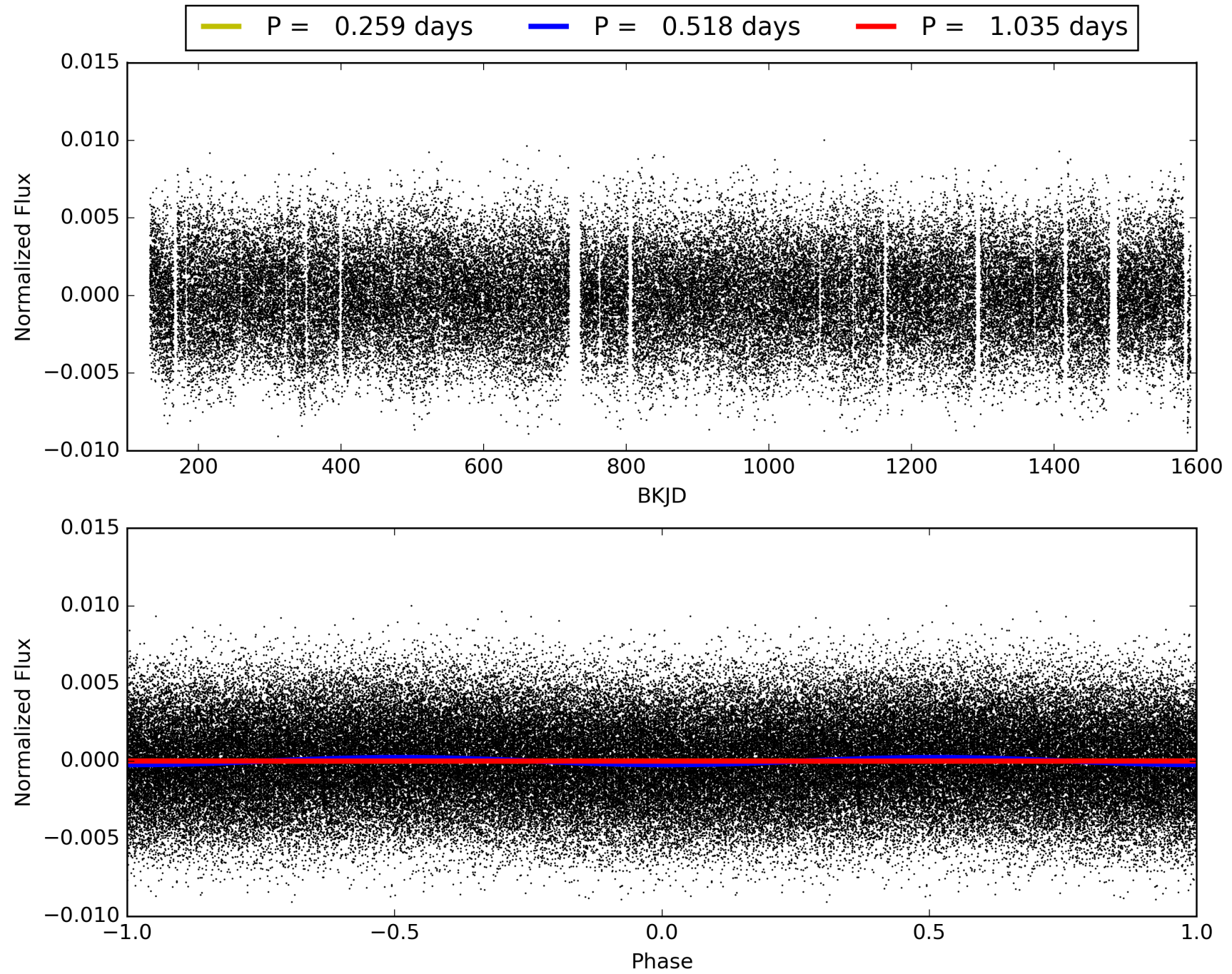
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:43:22 Z

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

TCE 009578461-02, PDC Light Curves

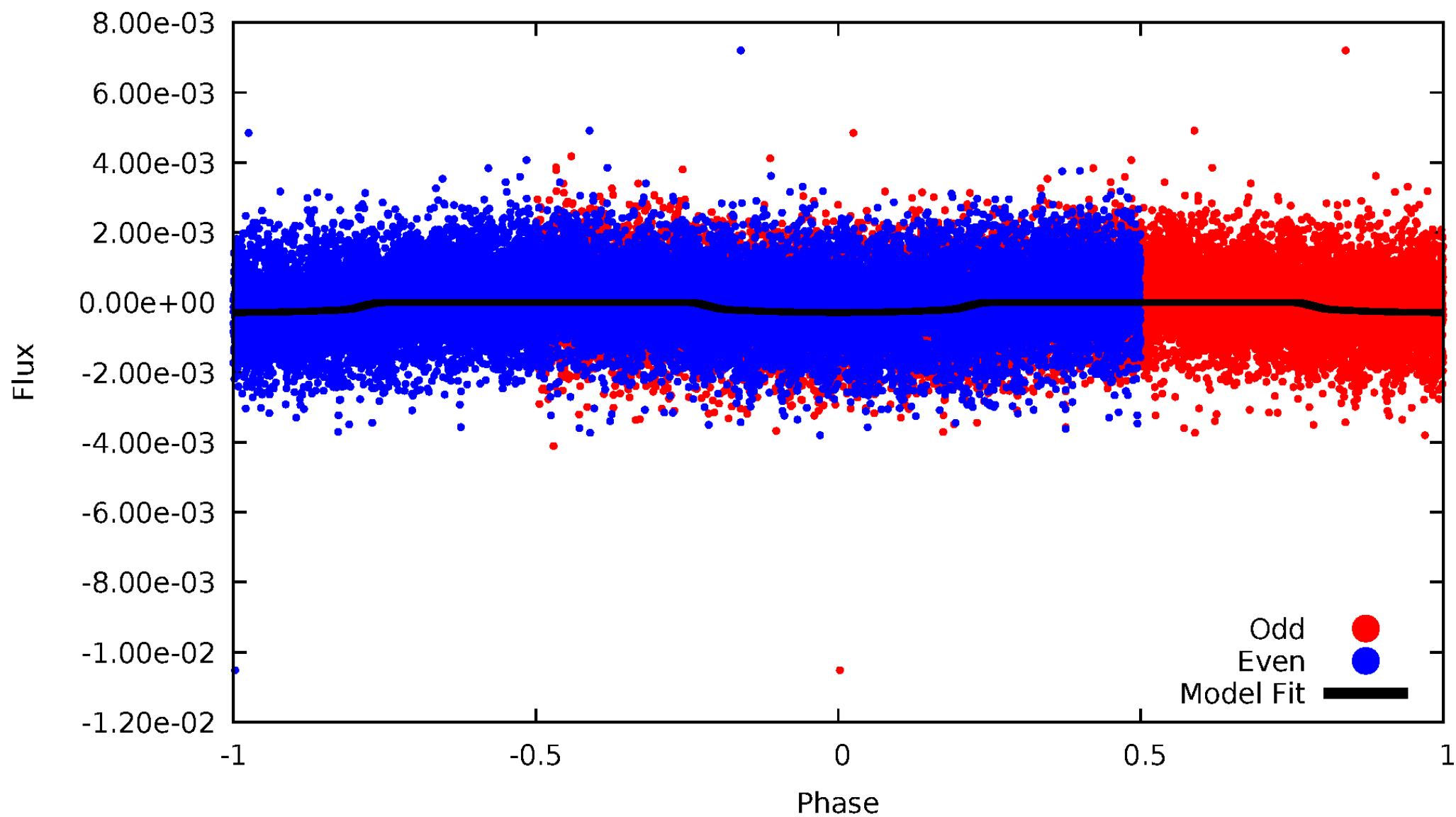


TCE 009578461-02



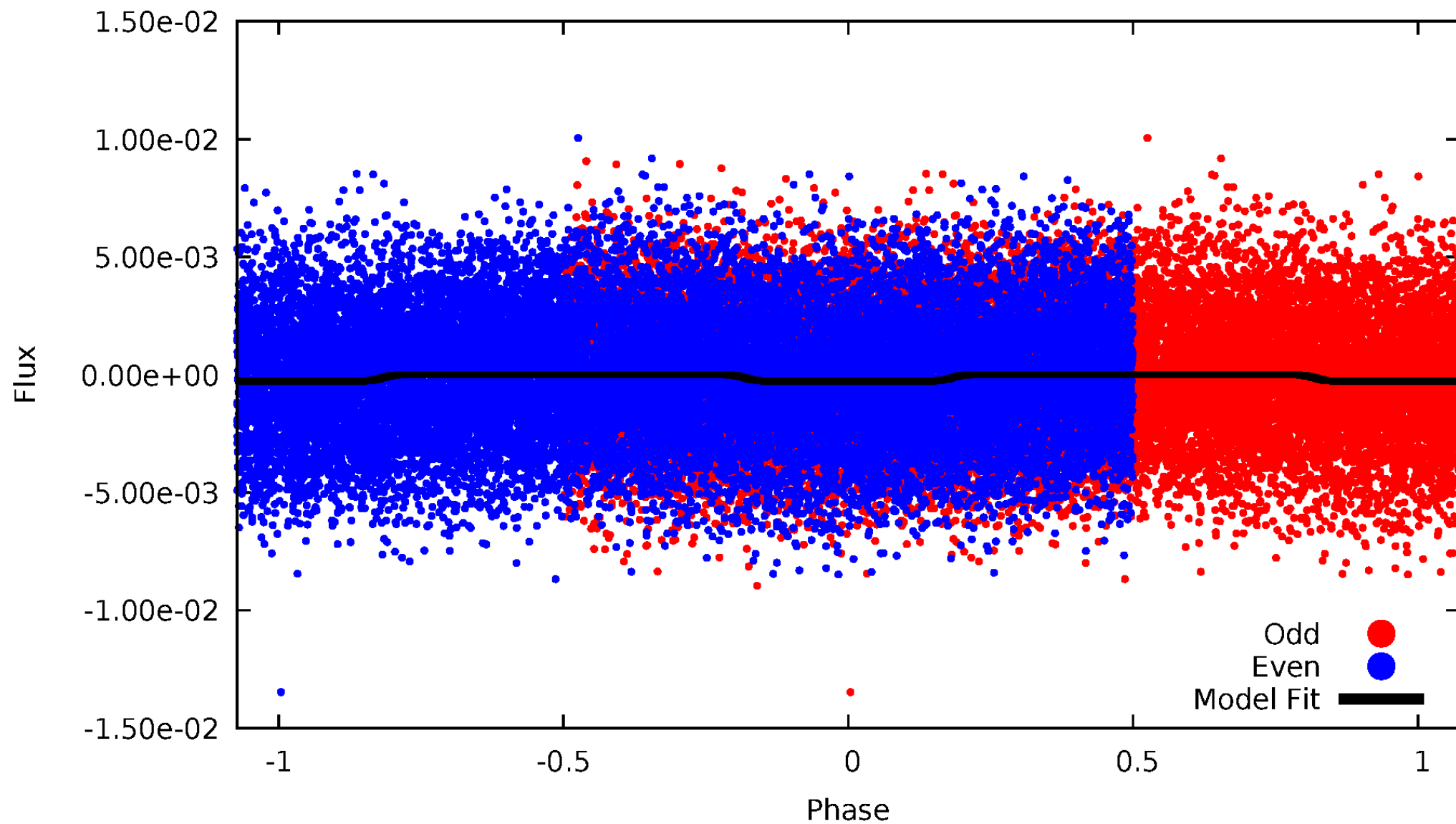
DV Odd/Even

TCE 009578461-02



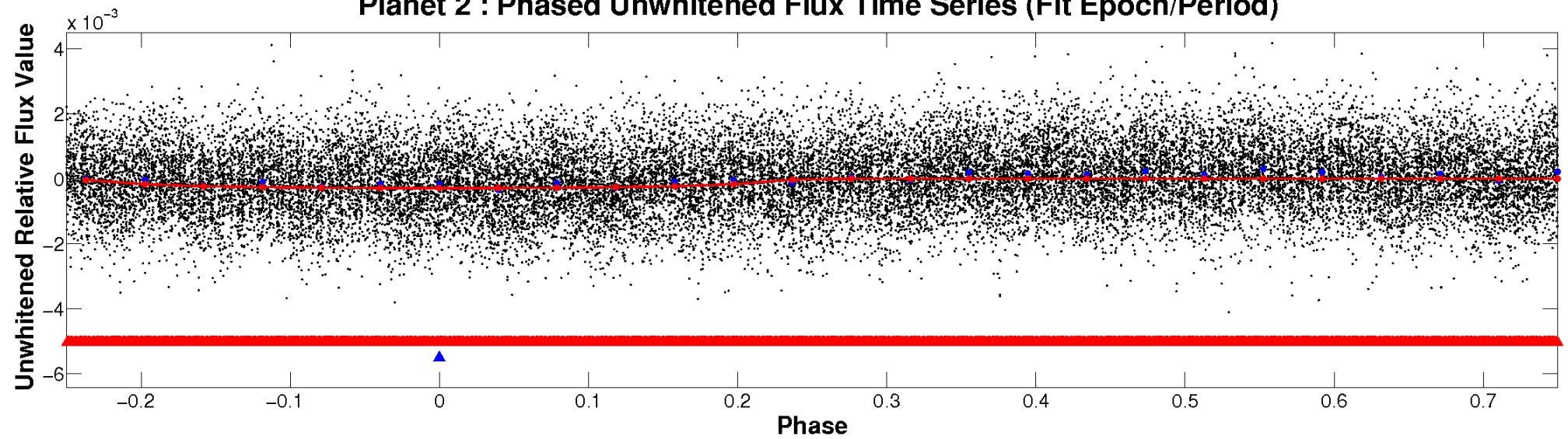
ALT Odd/Even

TCE 009578461-02

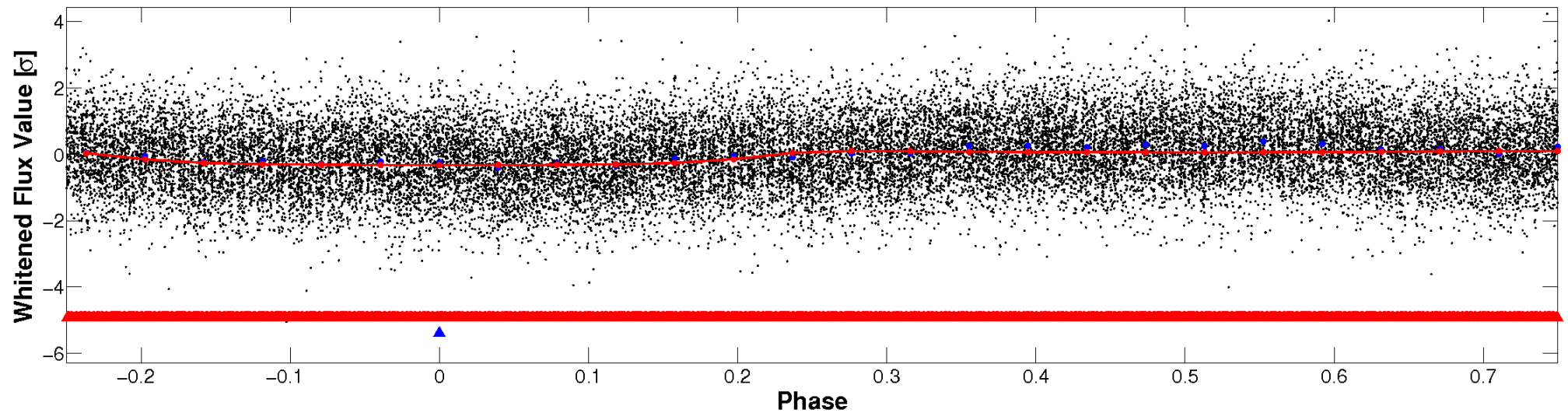


Non-Whitened Vs. Whitened Light Curve

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

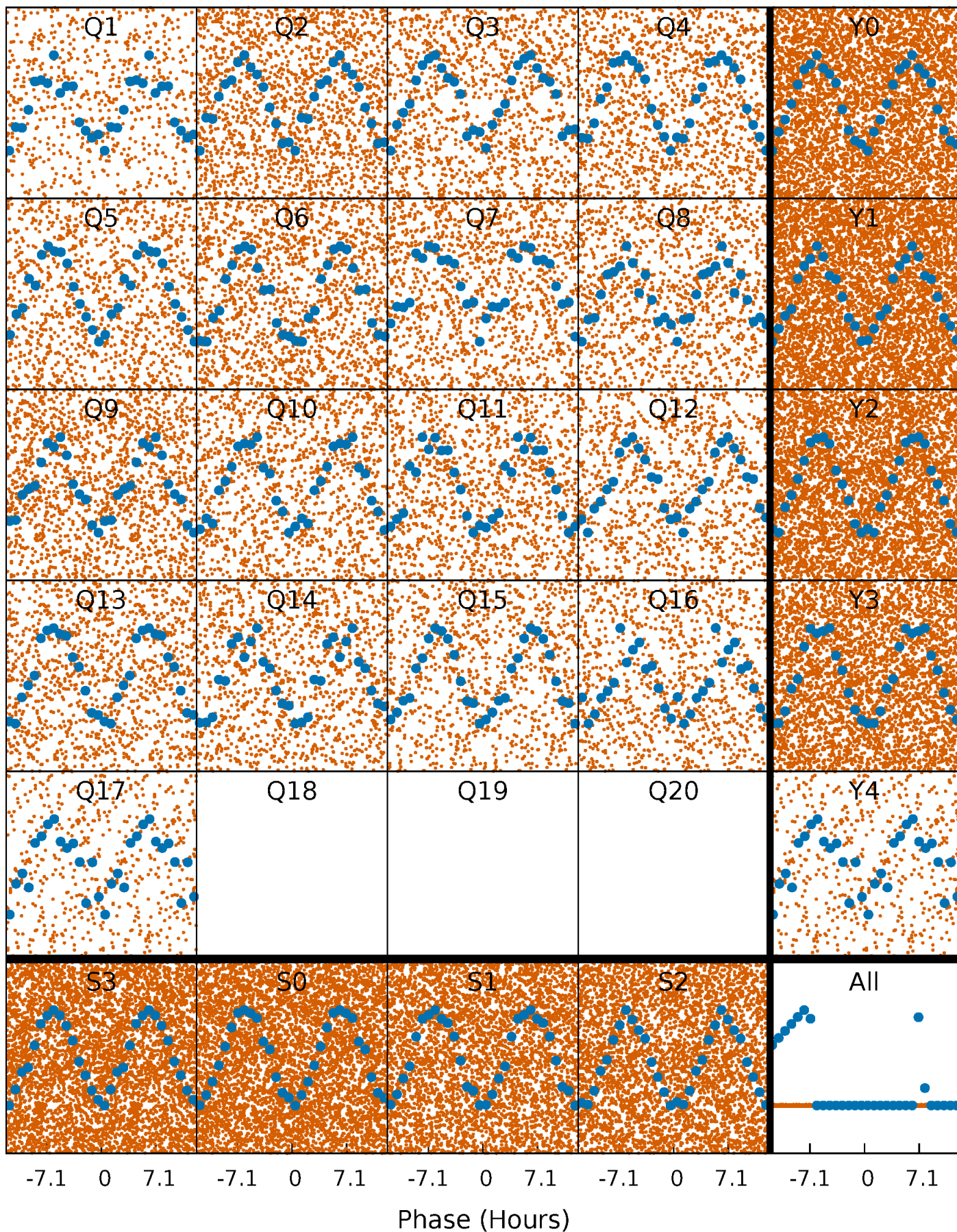


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



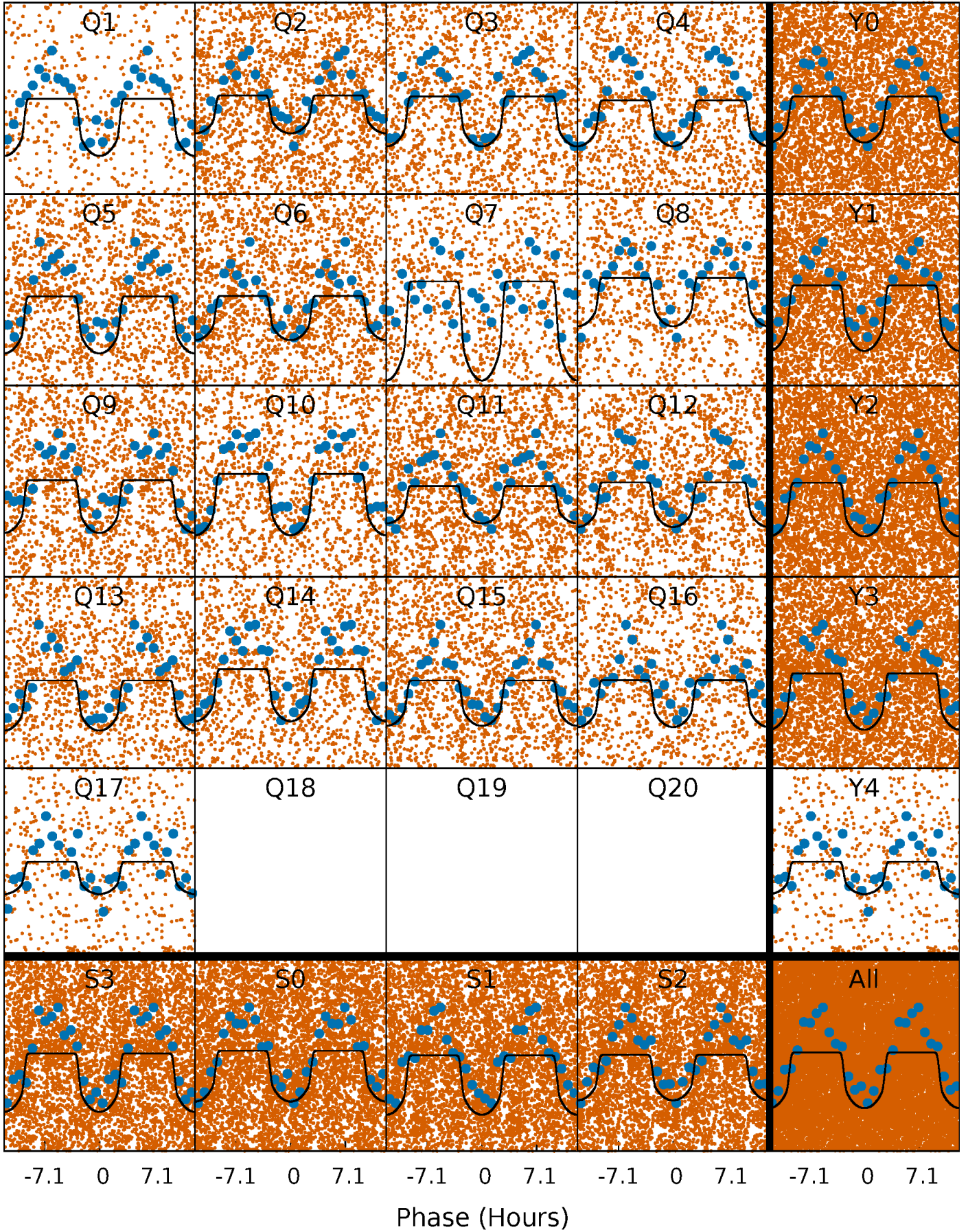
PDC Quarter-Phased Transit Curves

TCE 009578461-02 P= 0.517664 Days $T_0=131.851640$ (BKJD)



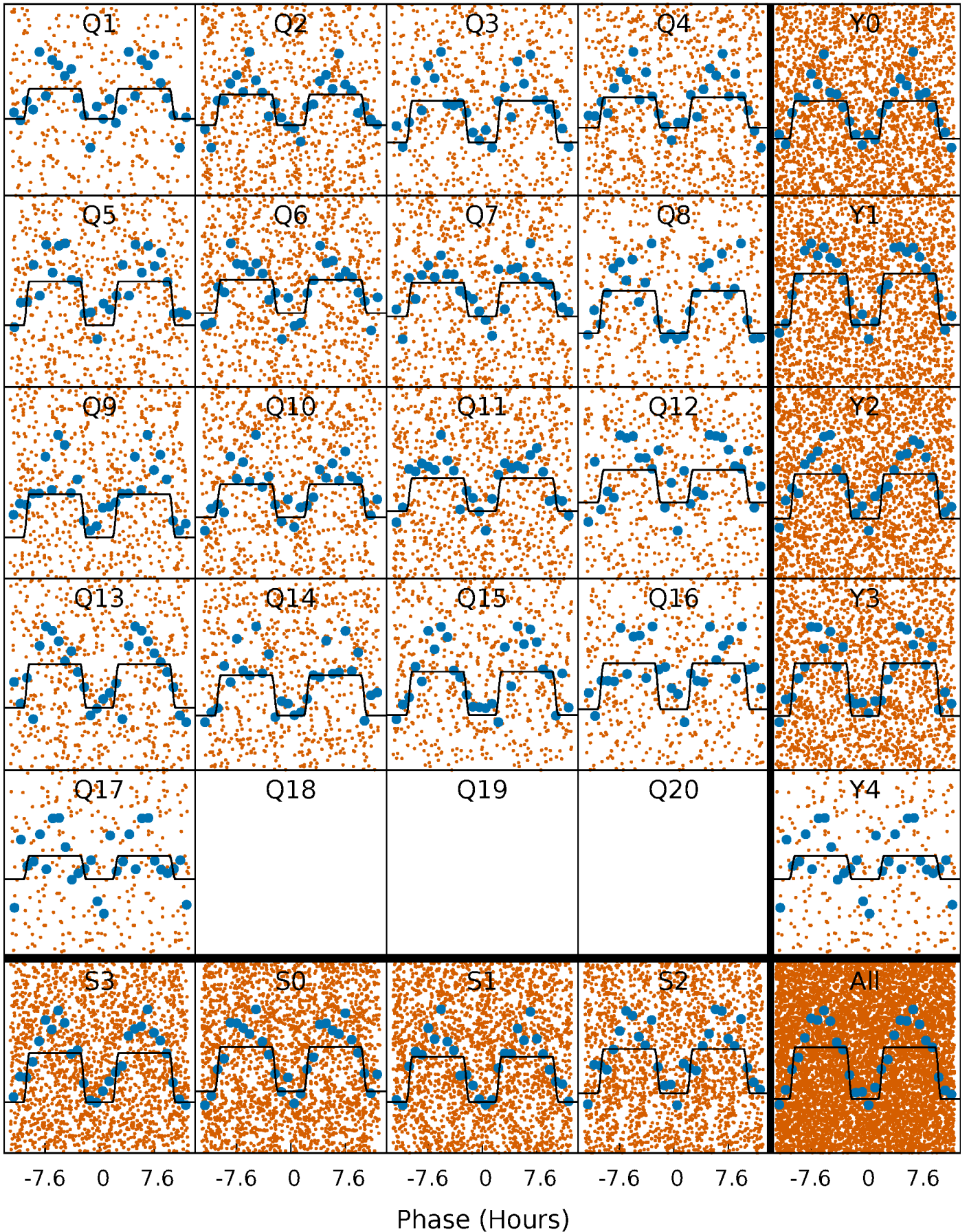
DV Quarter-Phased Transit Curves

TCE 009578461-02 P= 0.517664 Days $T_0=131.851640$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

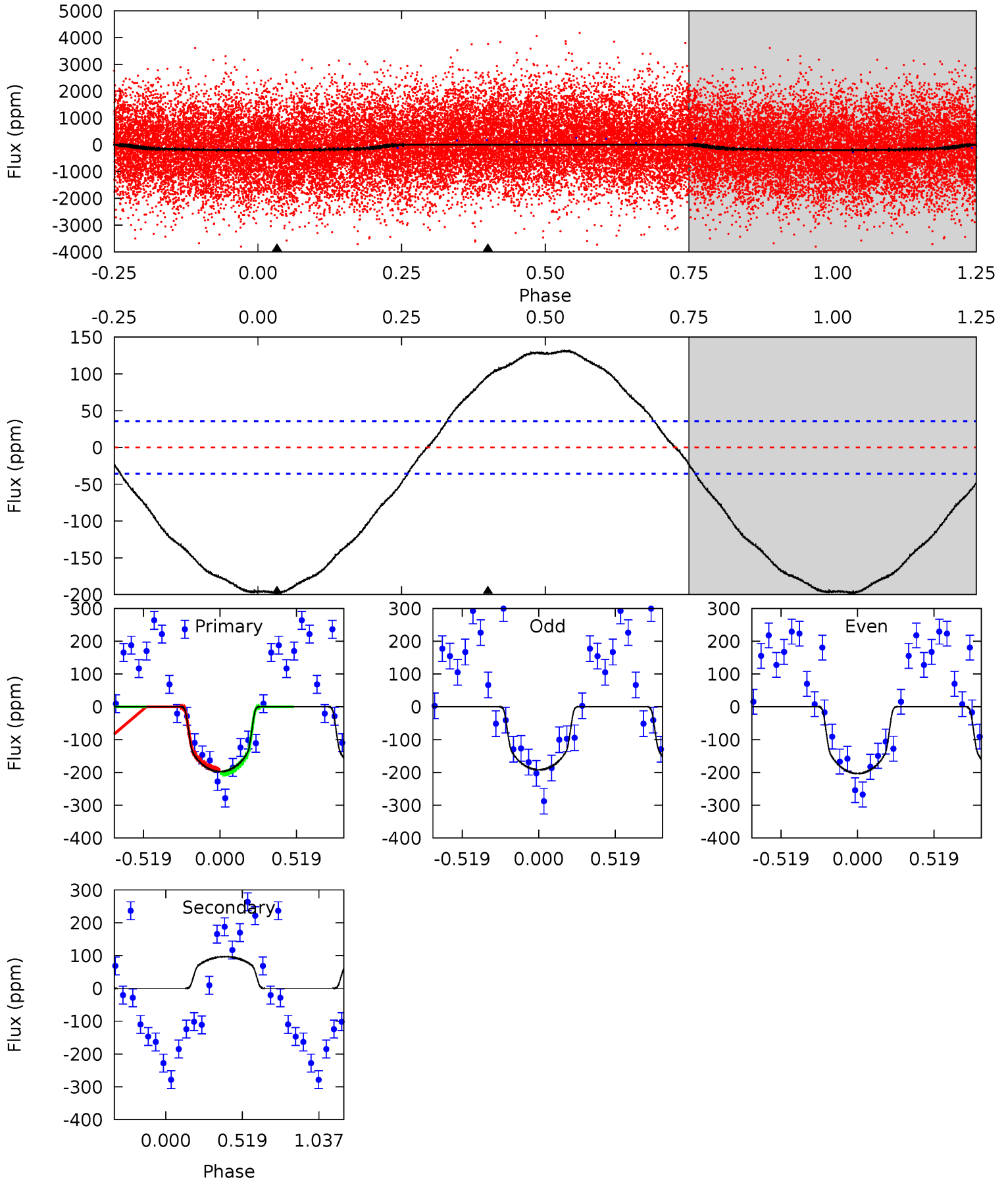
TCE 009578461-02 P= 0.517666 Days $T_0=131.851032$ (BKJD)



DV Model-Shift Uniqueness Test

009578461-02, P = 0.517664 Days, E = 131.333976 Days

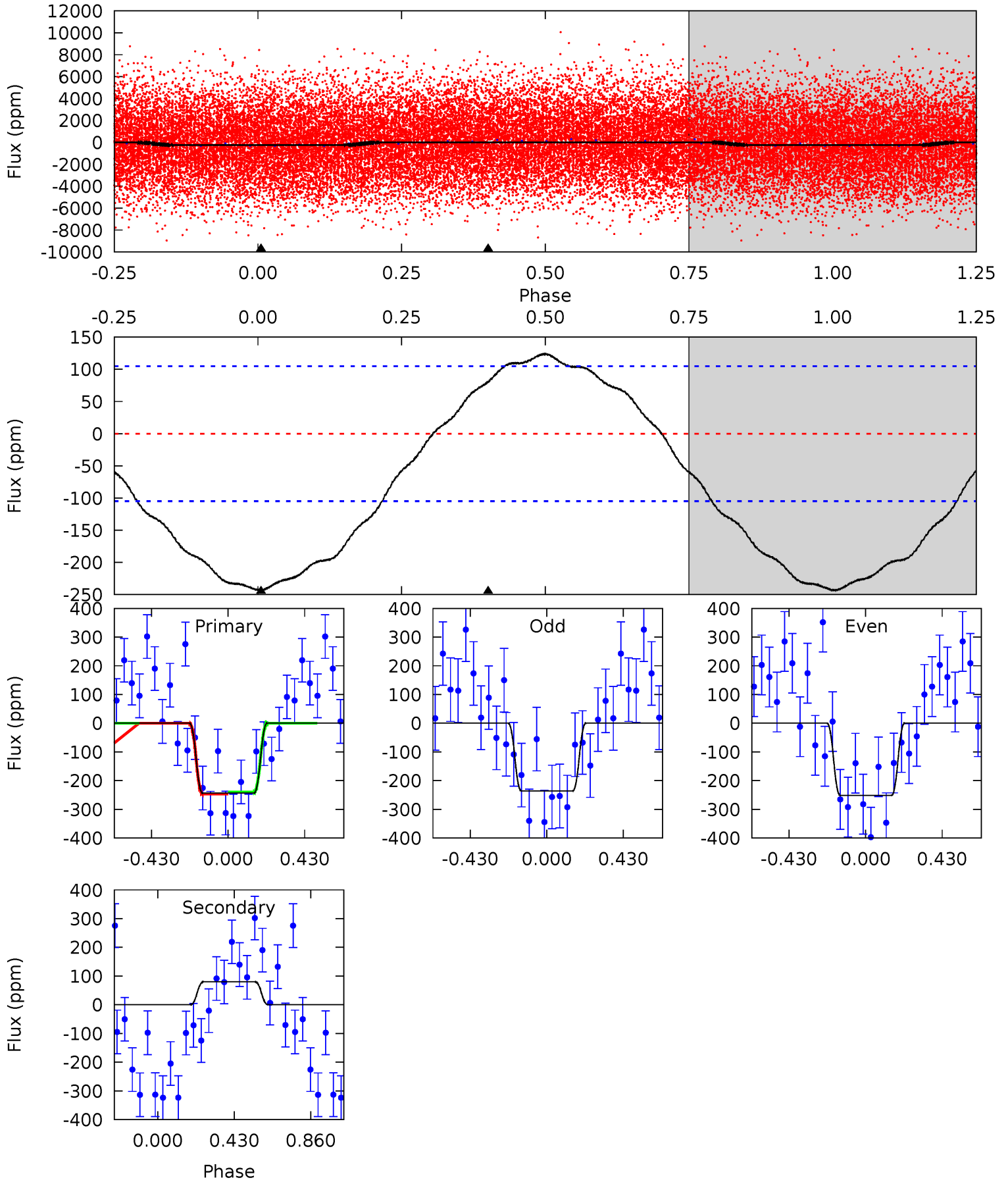
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.2	-11.3	0	0	4.21	0.65	3.33	23.2	23.2	-11.3	-11.3	0.67	3.41	0.40	0.76



Alt Model-Shift Uniqueness Test

009578461-02, P = 0.517666 Days, E = 131.333366 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.87	-3.26	0	0	4.25	0.79	1.40	9.87	9.87	-3.26	-3.26	0.32	1.11	0.34	0.14



Stellar Parameters For KIC 009578461

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	8252^{+236}_{-324}	$3.683^{+0.510}_{-0.090}$	$-0.460^{+0.200}_{-0.300}$	$3.300^{+0.545}_{-1.744}$	$1.913^{+0.079}_{-0.471}$	$0.075^{+0.433}_{-0.021}$
	+3%/-4%	+14%/-2%	+43%/-65%	+17%/-53%	+4%/-25%	+577%/-29%
Source	KIC0	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 009578461-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	97 ± 9	$5.33^{+1.02}_{-1.37}$	7129^{+540}_{-974}	-7128^{+457}_{-468}	$-0.443^{+0.132}_{-0.341}$
Alt.	80 ± 25	$5.33^{+1.02}_{-1.37}$	7060^{+574}_{-894}	-6883^{+552}_{-568}	$-0.389^{+0.165}_{-0.295}$

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

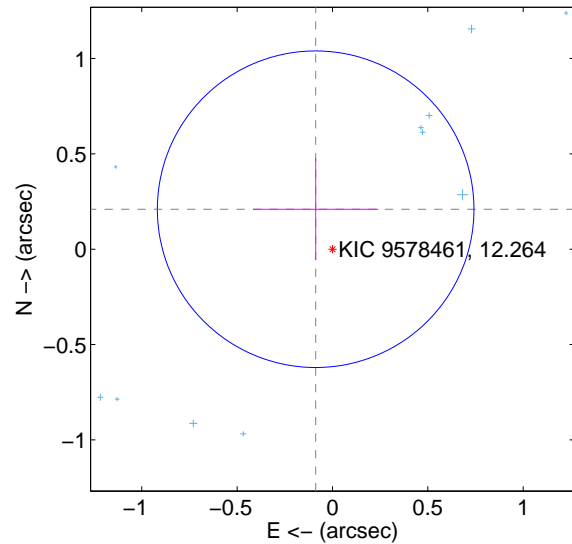
Supplemental centroid analysis for 009578461-02. Kepler magnitude: 12.26. Transit SNR 31.57

There are 17 quarters with good PRF difference image offsets

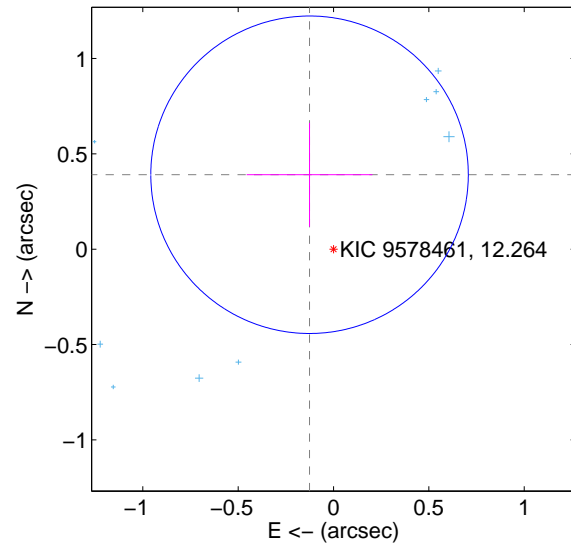
The direct PRF centroid is offset from the target star catalog position by about 0.31 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.227 ± 0.277	0.82	0.088 ± 0.329	0.209 ± 0.266
PRF-fit source offset from KIC position	0.410 ± 0.277	1.48	0.126 ± 0.330	0.390 ± 0.271
photometric centroid source offset	0.20 ± 0.02	8.01	0.13 ± 0.02	0.15 ± 0.03

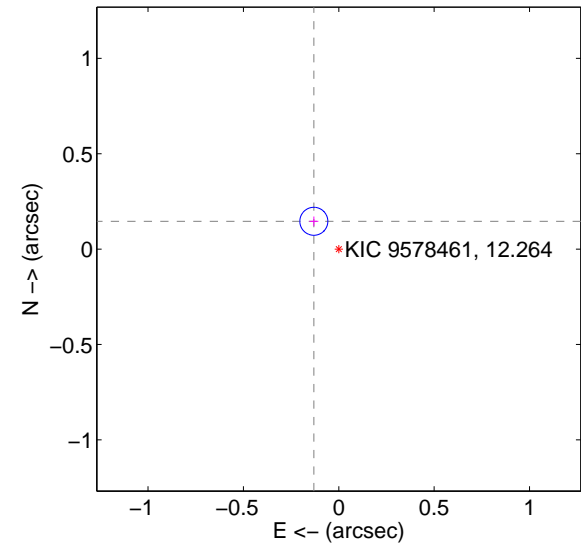
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

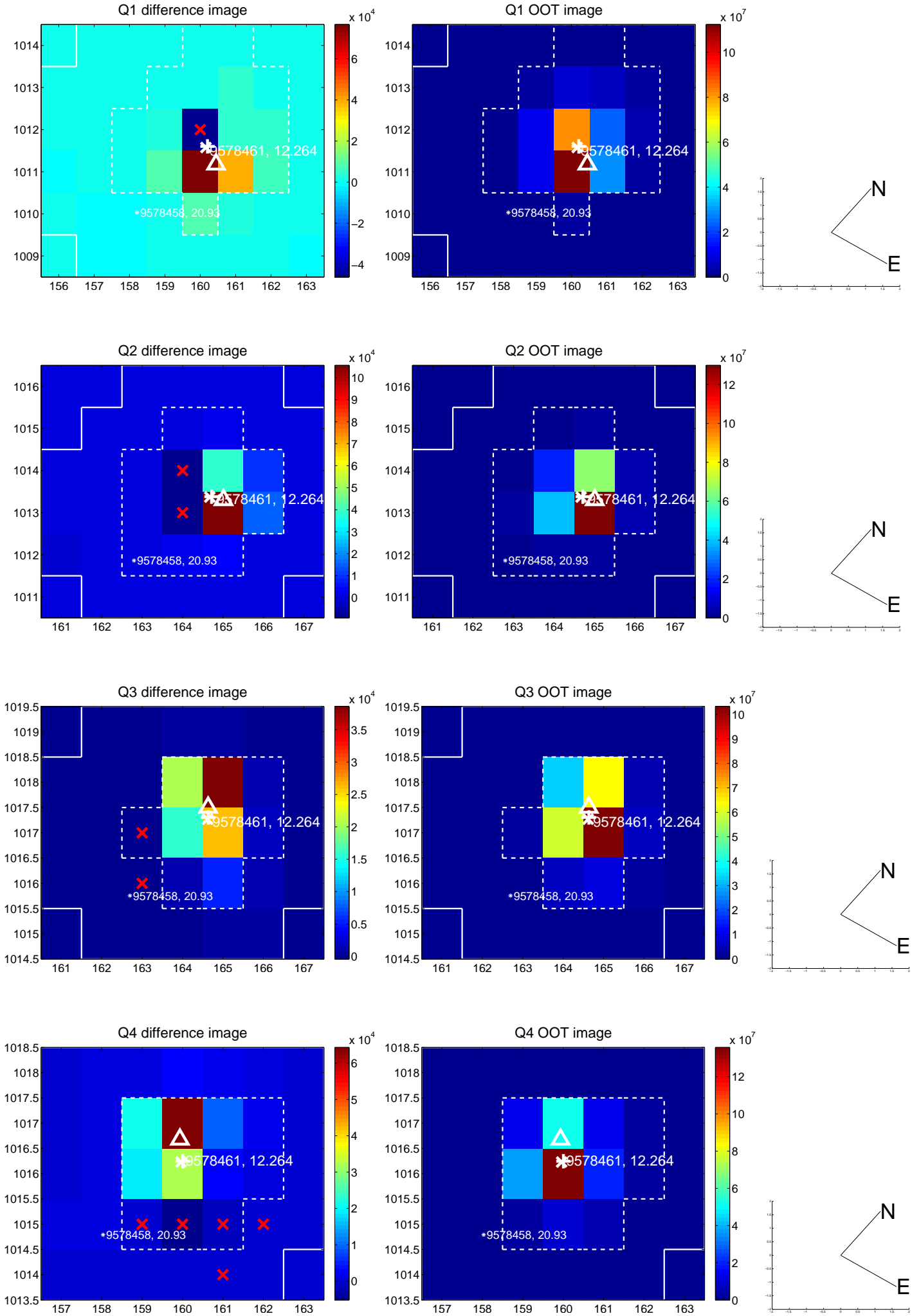


offset from photometric centroids

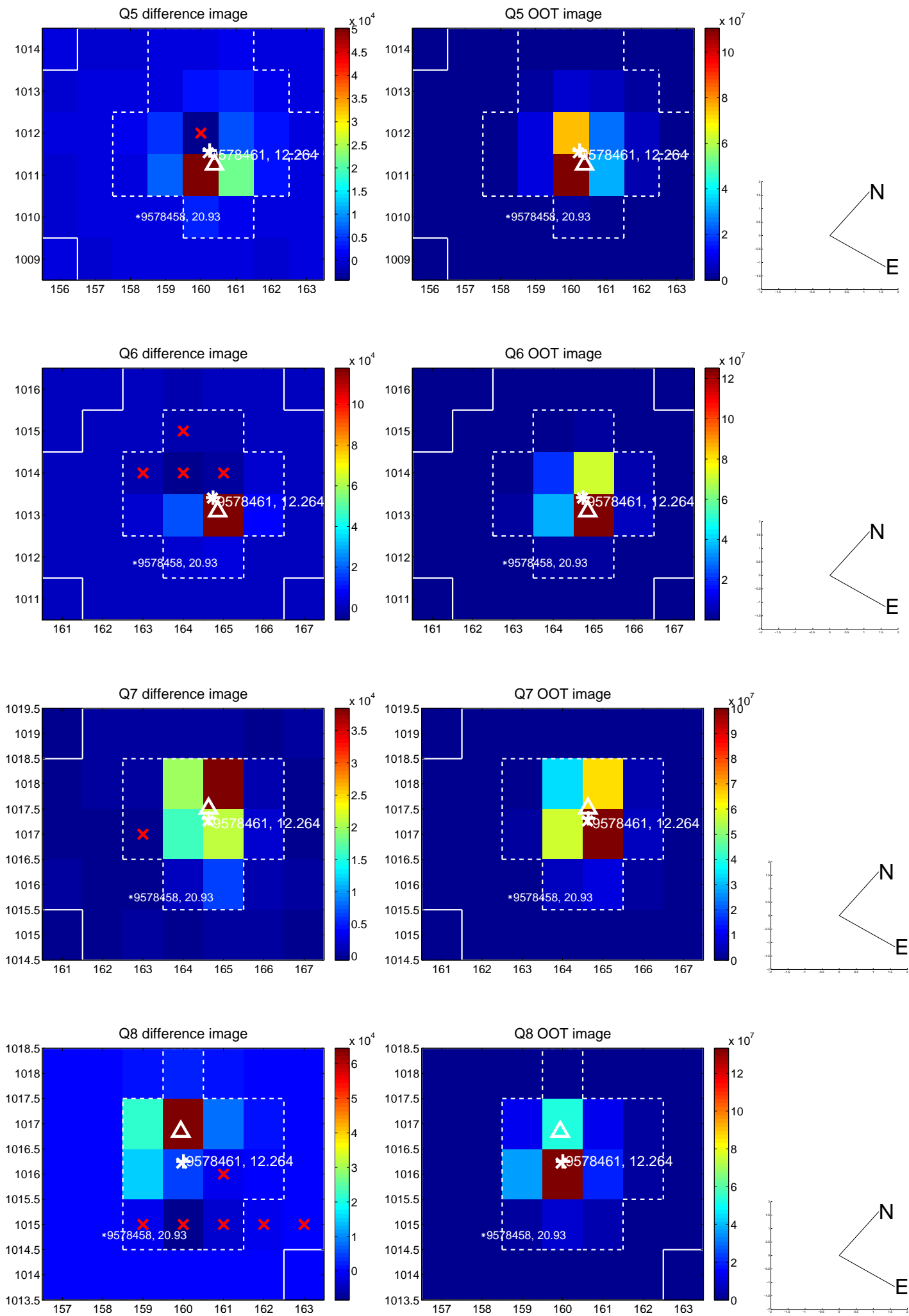


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

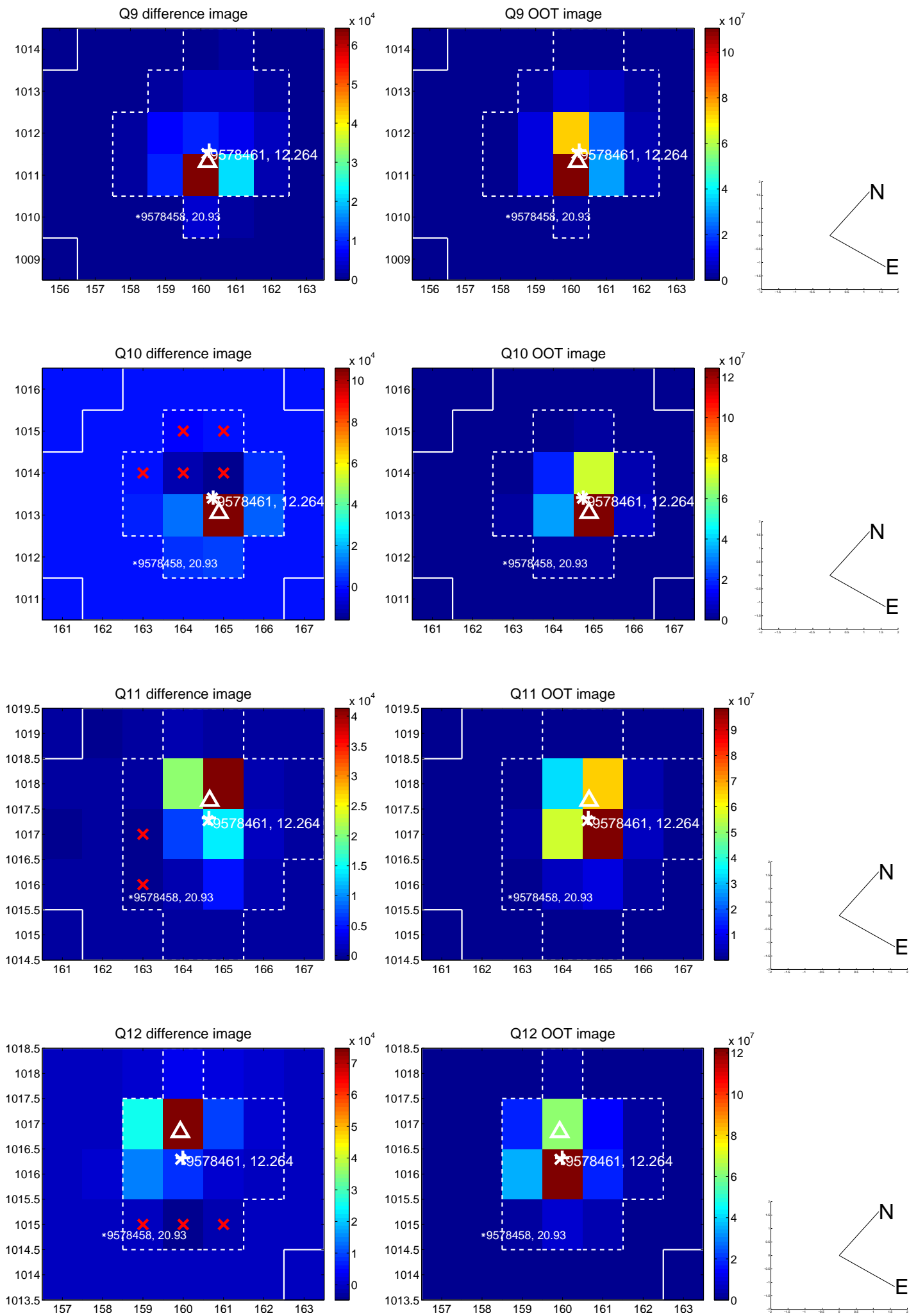
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



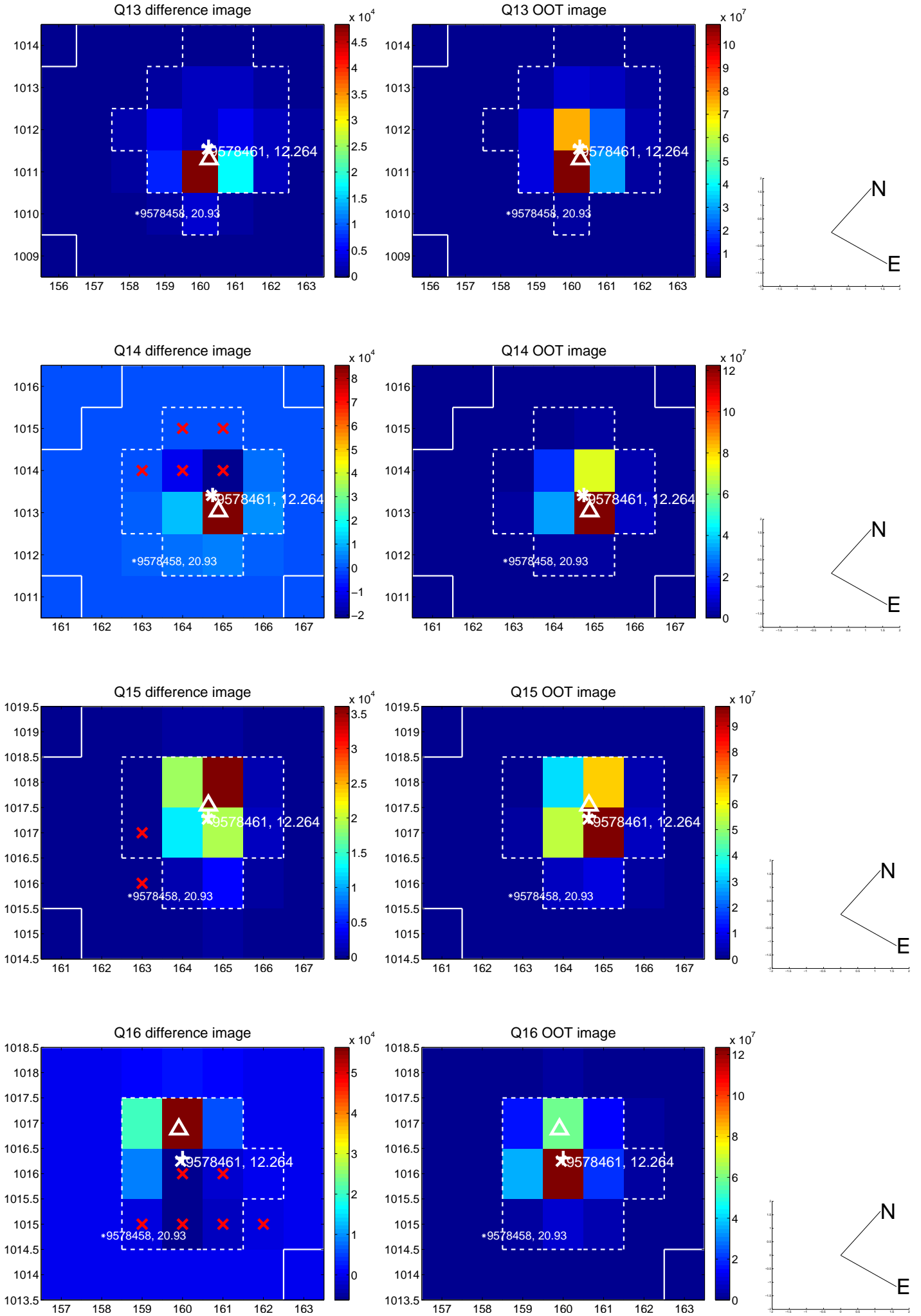
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



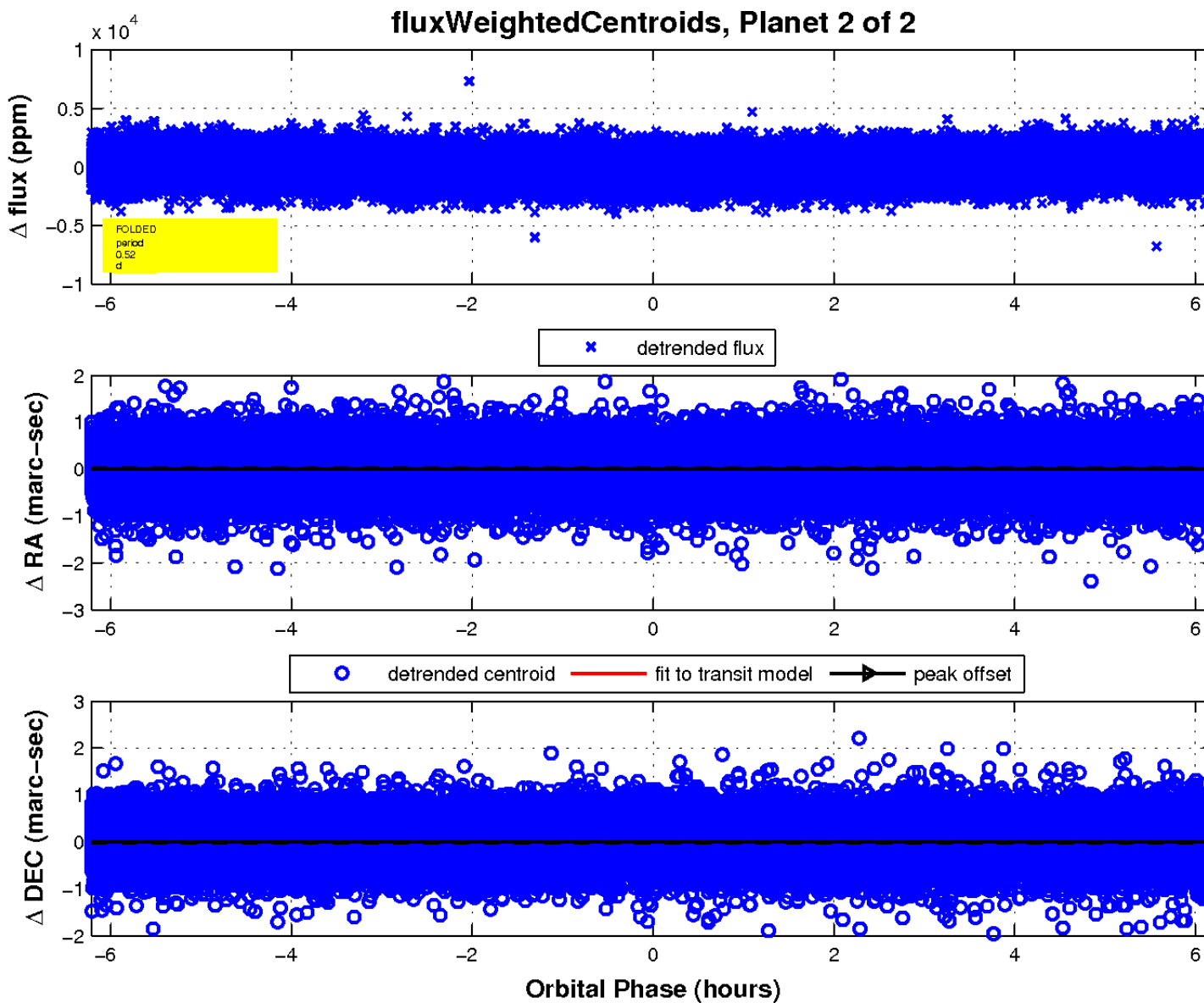
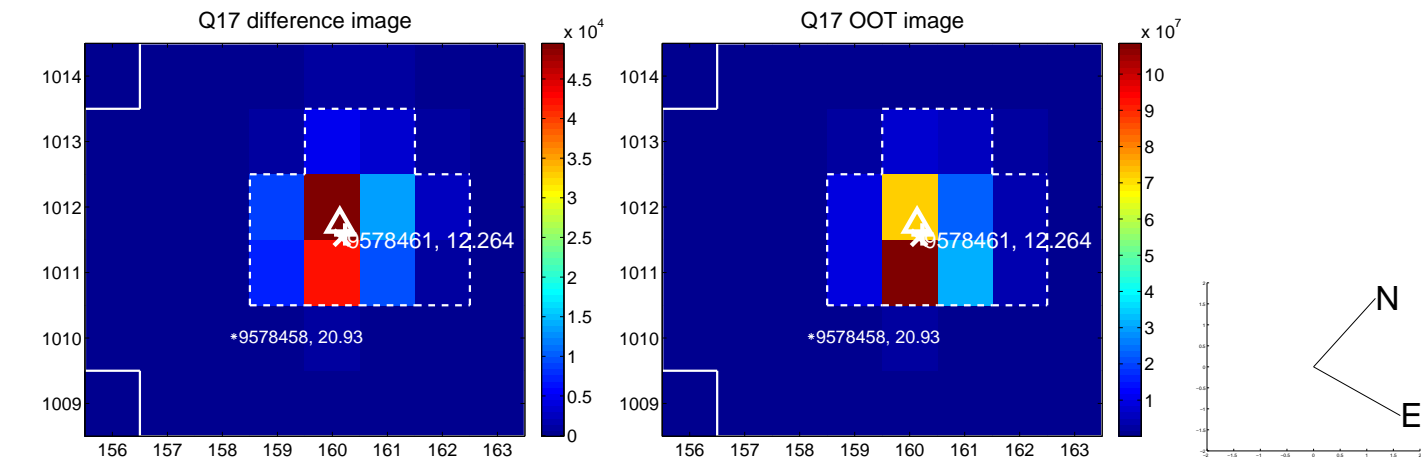
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UKIRT Image

Declination

